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OF
CIVIL ENGINEERS

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Vol. II JUNE, 1915 No. 6

BOSTON SOCIETY OF CIVIL ENGINEERS
FOUNDED 1848

PROCEEDINGS

NOTICE OF REGULAR MEETING.

A REGULAR meeting of the Boston Society of Civil Engineers will be held on

WEDNESDAY, JUNE 16, 1915,

at 7.45 o'clock P.M., in CHIPMAN HALL, TREMONT TEMPLE, BOSTON.

Prof. Charles F. Binns, M.Sc., Director of the New York State School of Clay Working and Ceramics at Alfred University, Alfred, N. Y., will address the Society on "The Application of Clay Products to Some Engineering Problems." Lantern slides will be used to illustrate the lecture.

Through the courtesy of the Sanitary Section, this address is given at a regular meeting of the Society.

S. E. TINKHAM, *Secretary.*

PAPERS IN THIS NUMBER.

"The Sewage Disposal Works at Fitchburg," D. A. Hartwell.
"The Public Service Corporation and the Municipality," James Logan.
Memoir of Robert L. Read.

CURRENT DISCUSSIONS.

Paper.	Author.	Published.	Discussion Closes.
Elimination of Grade Crossings.	L. B. Reilly.	April.	Aug. 15.
Ground Water Supplies.	W. S. Johnson.	May.	Aug. 15.

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Contributors are hereby notified that proof will not be submitted to them for examination unless requested before the 10th of the month preceding the month of publication.

MINUTES OF MEETING.

BOSTON, May 19, 1915. — A regular meeting of the Boston Society of Civil Engineers was held this evening at Chipman Hall, Tremont Temple, and was called to order at 8 o'clock by the President, Charles R. Gow. There were 102 members and visitors present.

By vote the reading of the record of the last meeting was dispensed with and it was approved as printed in the May JOURNAL.

The Secretary reported for the Board of Government that it had elected the following to membership in the grades named:

Members — Messrs. Horace Thomas Almy, Edwin Packard Bliss, James Edgar Borden, Albert O. Bullard, Russell Burroughs, Horace H. Chase, Charles R. Chevalier, Arthur S. Clapp, Frank Lemuel Clapp, Frederick Otis Clapp, Frederick Howe Clark, Harry B. Collins, Guy Spalding Deming, Alfred N. Denley, Walter A. Devine, William B. Durant, Joseph W. Farwell, Jr., Samuel Jones Fowler, Stephen DeM. Gage, John F. A. Giblin, John J. Harty, Jr., Ralph Warren Horne, Charles F. Joy, Jr., John Stevens Lamson, Herbert D. Leary, Arthur V. Lynch, Ernest W. McMullen, Robert W. Mawney, Arthur J. Maynard, Buckingham Miller, Fred William Morrill, James Henry O'Connor, Robert Heywood Parke, Ralph Farnham Rhodes, Carl Gee Richmond, Henry C. Robbins, Clarence H. Rooks, George Fuller Webb, Harold C. Whitmore and Frederick C. Williams.

Associates — Thomas P. O'Neil, John Edgar Simmons and Harry L. Whitney.

Juniors — Chauncey Davis Bryant, Frederick P. Donovan, Harold W. Putnam and Howard Haven Terhune.

The Secretary announced the deaths of three members of the Society: Past President Alexis H. French, who died May 3, 1915; Walter Jenney, who died May 3, 1915, and Edmund K. Turner, who died May 6, 1915. By vote the President was requested to appoint committees to prepare memoirs. The President has appointed as committee on memoir of Past President French, Messrs. Henry F. Bryant and Edward W. Howe; as committee on memoir of Walter Jenney, Messrs. Richard A. Hale and Arthur L. Plimpton; and as committee on memoir of Edmund K. Turner, Prof. George F. Swain.

The President then introduced the speaker of the evening, Prof. Albert Sauveur, of Harvard University, who gave an interesting talk on "The Structure of Iron and Steel," which was fully illustrated by lantern slides showing the result of microscopical examinations of iron and steel. At its conclusion, on motion of Professor Swain, the thanks of the Society were voted to Professor Sauveur for his very instructive address. Adjourned.

S. E. TINKHAM, *Secretary.*

APPLICATIONS FOR MEMBERSHIP.

[June 3, 1915.]

THE By-Laws provide that the Board of Government shall consider applications for membership with reference to the eligibility of each candidate for admission and shall determine the proper grade of membership to which he is entitled.

The Board must depend largely upon the members of the Society for the information which will enable it to arrive at a just conclusion. Every member is therefore urged to communicate promptly any facts in relation to the personal character or professional reputation and experience of the candidates which will assist the Board in its consideration. Communications relating to applicants are considered by the Board as strictly confidential.

The fact that applicants give the names of certain members as reference does not necessarily mean that such members endorse the candidate.

The Board of Government will not consider applications until the expiration of twenty (20) days from the date given.

CANNON, MADISON MOTT, Quincy, Mass. (Age 42, b. Brooklyn, N. Y.) Student for four years at Polytechnic Inst. of Brooklyn and for two years at Mass. Inst. of Tech. From 1895 to 1900, engineer in general practice; from 1900 to 1905, engineer with Fore River Ship Building Co.; from 1906 to date, engaged in designing and constructing extensive works along Atlantic coast; is now engineer for H. P. Converse Co., Boston. Refers to E. P. Bliss, F. H. Fay, F. W. Hodgdon and S. E. Tinkham.

EVERETT, FREDERIC ELWIN, Concord, N. H. (Age 39, b. New London, N. H.) Student at Mass. Inst. of Tech., fall of 1896 to spring of 1899. In 1899, draftsman with New England Tel. & Tel. Co.; from 1900 to 1906 with Park Dept., Cambridge, Mass.; from 1906 to date with New Hampshire Highway Dept. as assistant engineer, division engineer and acting highway commissioner. Refers to A. W. Dean, G. F. Hooker, W. B. Howe and J. W. Storrs.

HUNTER, ROBERT CHARLES, Charlestown, Mass. (Age 27, b. Charlestown, Mass.) From 1906 to 1908, rodman and transitman, Town of Brookline, Mass.; from 1908 to 1910, assistant engineer, Empire City Subway Co., New York, N. Y.; from 1910 to 1911, leveler with N. Y. State Highway Comm.; from 1911 to 1915, assistant engineer, N. Y. State Barge Canal; at present civil engineer in private practice, Malden, Mass. Refers to W. A. Devine, F. A. Leavitt, H. A. Varney and C. J. Wallace.

PITCHER, SAMUEL H., Worcester, Mass. (Age 51, b. Barbados, B. W. I.) Received technical education at McGill Univ., Montreal, Canada, 1886. Was for fourteen years assistant civil engineer with the City of Worcester; in private practice as civil engineer for seven years; and is now president of Samuel H. Pitcher Co., Worcester, Mass.; was connected with the abolition of grade crossings, Springfield and Worcester; is M. Am. Soc. C. E. Refers to H. P. Eddy, A. L. Fales and J. W. Rollins.

STRONG, EDWARD OWEN, Needham, Mass. (Age 26, b. Plymouth, Mass.) Student for three years at Worcester Polytechnic Inst., civil engineering course. Was for four years with G. A. Fuller Co., as timekeeper, superintendent and estimator; six months with Monks & Johnson as outside superintendent of construction; one year as general superintendent on construction for Associated Trust; is now junior partner of S. R. Troy Co., Boston. Refers to W. M. Bailey, Benjamin Boas, B. S. Brown, F. H. Dillaby, George Taylor and E. O. Tucker.

LIST OF MEMBERS.

ADDITIONS.

Almy, Horace T.	City Engineer's Office, Providence, R. I.
Bliss, Edwin P.	88 Broad St., Boston, Mass.
Borden, J. Edgar	194 Winter St., Fall River, Mass.
Brackett, Leroy G.	86 Sycamore St., Somerville, Mass.
Clapp, Frank L.	195 Boston St., Boston, Mass.
Clapp, Frederick O.	City Hall, Providence, R. I.
Clark, Frederick H.	338 City Hall, Springfield, Mass.
Coburn, Raymond W.	Kendal Green, Mass.
Collins, Harry B.	185 Davis Ave., Brookline, Mass.
Deming, Guy S.	66 Broadway, Lowell, Mass.
Durant, William B.	Turners Falls, Mass.
Gaudreau, Lucien E. D.	55 Central Ave., So. Braintree, Mass.
Giblin, John F. A.	37 Mayfield St., Dorchester, Mass.
Gray, Thomas F.	6 Herbert St., W. Somerville, Mass.
Maynard, Arthur J.	State Farm, Mass.
Richmond, Carl G.	68 Library St., Revere, Mass.
Robbins, Henry C.	88 Broad St., Boston, Mass.
Rooks, Clarence H.	Essex Co.'s Office, Lawrence, Mass.
Sarle, Oliver P.	146 Westminster St., Providence, R. I.
Simmons, John E.	34 So. Central Ave., Wollaston, Mass.
Taylor, Philip W.	745 Main St., Fitchburg, Mass.
Webb, George F.	Peterboro, N. H.

CHANGES OF ADDRESS.

Coburn, William H.	Care of American Woolen Co., Lawrence, Mass.
Lake, Harry E.	High St., North Wilmington, Mass.
Robinson, Harold L.	65 School St., Fall River, Mass.
Walker, Elton D.	138 So. Atherton St., State College, Pa.

DEATH.

Turner, Edmund K.	Died May 6, 1915

EMPLOYMENT BUREAU.

The Board of Government maintains an employment bureau for the Society, to be a medium for securing positions for its members and applicants for membership, and also for furnishing employees to members and others desiring men capable of filling responsible positions.

At the Society room two lists are kept on file, one of *positions available* and the other of *men available*, giving in each case detailed information in relation thereto.

MEN AVAILABLE.

310. Age 26. Graduate of Mass. Inst. of Tech., 1912, civil engineering course. Experience includes work as rodman on railway construction and maintenance and with U. S. Engr. Office, Boston; as timekeeper, paymaster and foreman with Lucius Engrg. Co., Pittsburg, Pa.; and as draftsman with Boston Transit Comm. Desires position with contractor. Salary desired, $4 per day.

311. Age 30. Graduate of Sheffield Scientific School, Yale Univ., 1909, degree of Ph.B., civil and sanitary engineering courses. Experience includes nine months as rodman and transitman with Boston Elevated Railway Co., eighteen months with Pennsylvania Lines West of Pittsburgh on maintenance and grade crossing work, and two and one-half years as civil engineer for Kelley Island Lime and Transport Co., Marblehead, O., work consisting of maintenance of plants and equipment, property surveys, dock construction, etc.; during this time was also engineer, maintenance of way, for Lakeside & Marblehead R. R. Co.; can handle field parties on any survey or construction work. Desires position as assistant with civil or sanitary engineer or corporation. Salary desired, $115 per month.

312. Age 35. Student at Mass. Inst. of Technology for three years course in mining engineering and metallurgy. Has had about thirteen years' experience, including two years on water works and sewerage construction at Panama; seven years on canal construction, Cape Cod Canal; and about four years on surveys, drafting, railroad work, etc. Would like appointment with person desiring his services, to discuss position and salary.

LIBRARY NOTES.

RECENT ADDITIONS TO THE LIBRARY.

U. S. Government Reports.

Life History of Lodgepole Pine in Rocky Mountains.

Results of Magnetic Observations made by United States Coast and Geodetic Survey in 1913.

Triangulation in Alabama and Mississippi, 1915.

State Reports.

Massachusetts. Report of Public Service Commission on Specifications for Bridges Carrying Electric Railways, 1915.

Michigan. Annual Report of State Board of Health for 1913.

New York. Annual Report of Department of Efficiency and Economy Concerning Matters Relating to Construction and Maintenance of Public Highways, 1915. Gift of Arthur H. Blanchard.

Wisconsin. Geological and Natural History Survey: Polyporaceæ of Wisconsin, by J. J. Neuman; Methods of Mine Valuation and Assessment, by W. L. Uglow.

Municipal Reports.

Brockton, Mass. Annual Reports of Water Commissioners for 1907, 1908, and 1911–14.

Chicago, Ill. Loss of Head Due to Friction in Fire Hydrants, 1914.

Fall River, Mass. Annual Report of City Engineer for 1914.

Fitchburg, Mass. Semi-Annual Reports of Sewage Disposal Commission for 1914.

Gloucester, Mass. Annual Report of Water Commissioners for 1914.

Haverhill, Mass. Annual Report of Water Commissioners for 1914.

Holyoke, Mass. Annual Report of Water Commissioners for 1914.

Plainfield, N. J. Annual Report for 1914.

Woonsocket, R. I. Annual Report of Water Commissioners for 1914.

Miscellaneous.

Boston Elevated Railway Co.: Annual Report of Directors for 1914; Safety on Boston Elevated Railway, 1914.

New International Encyclopaedia, Vols. 9–12.

LIBRARY COMMITTEE.

NEW ENGINEERING WORK.

(Under this head a brief description of new engineering work contemplated or under construction will be presented each month. Engineers and contractors are requested to send descriptions of their work to the Secretary, 715 Tremont Temple, Boston, before 1st of each month.)

United States Government. — NAVY DEPARTMENT. — *Navy Yard, Boston.* — Completion of shipbuilding ways. Erection of four shipbuilding cranes. Equipment of radio station on Naval Hospital grounds in Chelsea.

Commonwealth of Massachusetts.— METROPOLITAN WATER AND SEWERAGE BOARD. — *Water Works.* — The work of laying about 14 000 linear feet of 60-in. cast-iron pipe in Commonwealth Ave. between Prince St. and the Charles River in Newton is in progress under contracts with Andrew M. Cusack, of Boston, and Charles A. Kelley, of Somerville.

Work under contract with John J. Evans, of Lawrence, for laying 24-in. cast-iron pipe is in progress in Washington St., Dorchester Lower Mills.

The painting of the new steel tank on Bellevue Hill, West Roxbury, is nearing completion. The work on the granite masonry tower which is to enclose the tank is now in progress under contract with John Cashman & Sons Co., of Boston.

Sewerage Works. — Work is in progress on the relief outfall sewer at Nut Island and on surveys for the high level sewer to Wellesley.

METROPOLITAN PARK COMMISSION. — The following work is in progress:

Charles River Reservation. — Plans and specifications for construction of a three-arch masonry bridge over the Charles River at North Beacon St., Boston and Watertown.

Furnace Brook Parkway. — Construction of parkway extension from Quincy Shore Reservation to Hancock St., Quincy. John Cashman & Sons Co., contractors.

Nantasket Beach Reservation. — Construction of concrete bulkhead walls. Hugh Nawn Contracting Co., contractors.

Mystic Valley Parkway. — Constructing parkway from Cradock Bridge to Mystic Ave. Coleman Brothers, contractors.

General. — General repairs to roads and treatments with bituminous binders.

DIRECTORS OF THE PORT OF BOSTON. — *Bulkheads.* — The filling is being put in at the south bulkhead, South Boston, and is about 80 per cent. completed.

Boston Transit Commission. — *Enlargement of Park Street Station.* — The interior of the enlargement of the station is being finished in white cement plaster.

Notes on the status of the work on the Dorchester Tunnel and the East Boston Tunnel Extension were printed in the May issue of the JOURNAL.

City of Boston. — PUBLIC WORKS DEPARTMENT, HIGHWAY DIVISION, PAVING SERVICE. — Work is in progress on the following streets:

Frankfort St.,	Neptune Rd. to Bennington St.	Bituminous macadam.
Convent Path,	Breed St. to Gladstone St.	Art. stone steps and wall.
Braintree St.	Franklin St. to Everett St.	Hassam block pavement.
Saybrook St.	Market St. to Dustin St.	Bituminous macadam.
Albano St.,	Washington St. to Amherst St.	Bituminous macadam.
Rosecliff St.,	Washington St. to Kittredge St.	Bituminous macadam.
Barbara St.,	So. Huntington Ave. to Centre St.	Bituminous macadam.
Kittredge St.,	Rosecliff St. to Metropolitan Ave.	Bituminous macadam.
Spring St.,	Gardner St. to Webster St.	Bituminous macadam.
Hillcrest St.,	Elgin St. to Temple St.	Excavating and grading.
Temple St.,	Spring St. to Ivory St.	Excavating and grading.
Basto Ter.,	South St. 322 feet northerly.	Bituminous macadam.
Seaver St.,	Blue Hill Ave. to Humboldt Ave.	Excavating and grading
Seaver St.,	Humboldt Ave. to Walnut Ave.	Excavating and grading.
Wellington Hill Footway,	Wellington Hill St. to Walk Hill St.	Artificial stone steps.
Deering Rd.,	Blue Hill Ave. to Harvard St.	Bituminous macadam.
Fabyan St.,	Blue Hill Ave. to Harvard St.	Asphalt pavement.
Hopestill St.,	Aspinwall Rd. to Southern Ave.	Asphalt pavement.
Dempster St.,	Ruggles St. to Halleck St.	Hassam block pavement.
Neponset Ave.,	Holbrook Ave. to Tolman St.	Artificial stone sidewalks.
Neponset Ave.,	Boutwell St. to Minot St.	Artificial stone sidewalks.
Dracut St.,	Dorchester Ave. to Bruce St.	Artificial stone sidewalks.
Lockwood St.,	Metropolitan Ave. to Huntington Ave.	Bituminous macadam.

The Fore River Shipbuilding Co., Quincy, Mass., has the following work in progress:

U. S. Battleship *Nevada*.
Nine U. S. submarine boats.
U. S. Torpedo Boat Destroyers *Cushing*, *Tucker* and Nos. *63* and *64*.
Two oil-tank steamers.
One molasses tank steamer.

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BOSTON SOCIETY OF CIVIL ENGINEERS
FOUNDED 1848

PAPERS AND DISCUSSIONS

This Society is not responsible for any statement made or opinion expressed in its publications

THE SEWAGE DISPOSAL WORKS AT FITCHBURG, MASS.

By David A. Hartwell, Member Boston Society of Civil Engineers.

(Presented before the Sanitary Section, March 3, 1915.)

The city of Fitchburg is situated in a narrow valley nearly semicircular in shape and about six miles long, through which flows the north branch of the Nashua River. The total fall of the river through the city is nearly 300 ft., which is fully developed for power. The first sewers were built in 1868, when the population was about 10 000. As the population increased, sewers were built as needed, until in 1910 with a population of about 38 000 there were 41 miles of sewers. Outlets for these sewers were built to the river at the most convenient and inexpensive locations, and in 1910 there were 27 such outlets in a distance of about 5 miles.

The drainage area of the river at Fitchburg is about 62 square miles, but even with a fair amount of storage of the run-off there was still such a low flow during the summer months that odors, caused by the pollution of the water, were noticeable at a considerable distance from the river. Objections were raised by different manufacturing interests to the pollution of the river by sewage, but only one suit was brought, and that

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Note. Discussion of this paper is invited, to be received by Edward C. Sherman, Editor, 6 Beacon Street, Boston, before August 15, 1915, for publication in a subsequent number of the Journal.

was withdrawn before the time of trial. The great need of improving the condition of the river was nevertheless appreciated by the city authorities, but there was, with each administration, a desire to defer as long as possible the large increase in the city debt that would be necessitated by the construction of a main sewer and a disposal plant.

Studies and Reports.

The problem of removing the sewage from the river and providing some form of treatment has been studied at different times. The writer first studied the question in 1895 with the late Mr. Charles A. Allen, of Worcester, and reported to the city council in 1896. It was again studied with the late Mr. Freeman C. Coffin, of Boston, in 1900, and a report submitted in 1901; and still further studied in 1901 with Mr. T. Howard Barnes, of Boston, and a report submitted in 1902.

The recommendations in these three reports were about the same, involving the construction of a main intercepting sewer in substantially the same location, and the disposal of the sewage by intermittent sand filtration with probably some form of tank treatment before filtration. Septic tanks at that time were apparently offering a partial solution of the serious problem of caring for the sludge settled in any form of tank. No construction was attempted, although a city council committee went so far as to ask for and receive the approval of the State Board of Health in December, 1903, of the proposed system as outlined in the Coffin report.

By 1909 the pollution of the river was so excessive and the objections of mill owners and of the State Board of Health were so great that the city council deemed it useless any longer to defer action towards removing the sewage from the river. A bill was introduced by the city council in the legislature, which was enacted as Chapter 461 of the Acts of 1910 and was approved April 28, 1910. This bill authorized the appointment by the mayor of three legal voters to constitute a board of sewage disposal commissioners for a term of office not to exceed seven years. This commission was to have full charge of all work of every nature relative to the sewers and drains of the city, and also was to construct a main sewer and disposal works subject to the approval of the State Board of Health. This commission was appointed in June, 1910, and the writer accepted the appointment as chief engineer and superintendent on December 1, 1910.

A paper read before the Sanitary Section on February 5, 1913, and published in the *Journal of the Association of Engineering Societies* for August, 1913, described the design and construction of the intercepting sewer, and in this paper I will confine myself to the disposal works.

VOLUME OF SEWAGE.

In designing the disposal works, provision was not made for caring for the full capacity of the intercepting sewer, which, at the upper end of the siphon, is 30 000 000 gals. per day. The 30-in. inverted siphon, covering the distance of 5 430 ft. immediately above the disposal works, has a capacity of 14 000 000 gals. per day, as indicated by the Venturi meter for a period of six hours. While it is possible to deliver 14 000 000 gals. a day to the disposal works, the plant was not constructed to treat that amount of sewage. The population of Fitchburg in 1910 was 37 826. The average rate of gain for each five years for the thirty years from 1880 to 1910 was 21 per cent., and the average gain for each five years for the twenty years from 1890 to 1910 was 14.6 per cent. With an assumed increase of 15 per cent. for each five years, the population would be 43 400 the present year, 57 400 in 1925 and 87 200 in 1940. At the present time there are about 35 000 people using the sewers, and the flow is about 3 400 000 gals. It was thought best to make provision in designing the Imhoff tanks for a population of 55 000, which would probably be as many people as would be contributing to the sewage flow in 1930 or 1935, owing to a considerable number of the people living at locations without sewerage.

VENTURI METER.

The sewage as it arrives at the disposal works first passes through a 30-in. by 15-in. Venturi meter which is placed under-ground in a concrete chamber directly at the rear of the laboratory building. This meter is equipped with vent cleaners and hand hole openings on both the upstream and throat pressure chambers. The float pipes are connected with the city water pipe with a small jet opening, so there is a slight movement of the liquid from the float pipe to the meter, thus preventing the sewage from entering the float pipes.

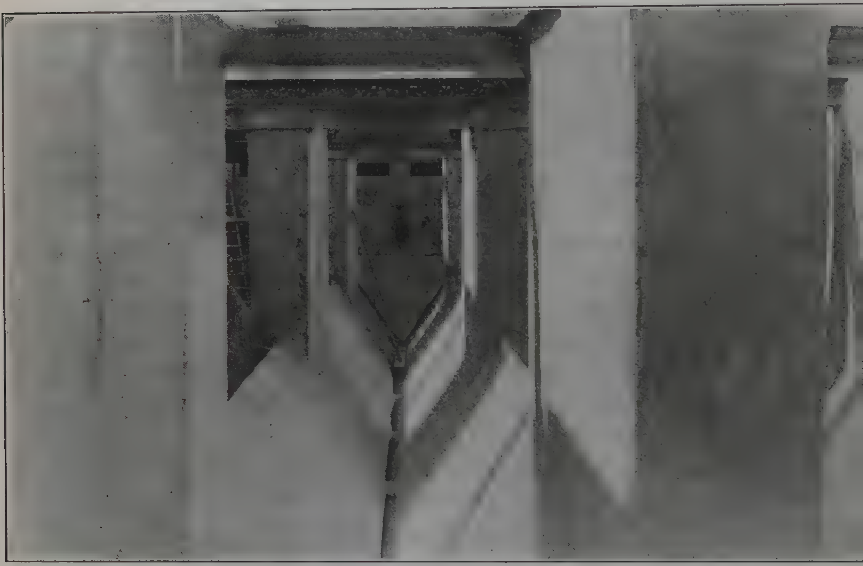

FIG. 1. SETTLEMENT CHAMBER OF IMHOFF TANK.

IMHOFF TANKS.

The Imhoff tanks are five in number, covering an area of about 100 ft. by 160 ft. Each tank is rectangular in plan and 30 ft. by 90 ft. inside measurement. Each tank has three bottoms in the shape of inverted pyramids, with an altitude of 7 ft. 6 ins. The side walls of each tank are 18 ft. 5 ins. high, with a batter on each side of 3 ins., while the end walls are vertical on the inside of the tanks. The extreme height of the concrete of the tanks is 27 ft. The concrete in the tank bottoms is reinforced with rods, and the side and end walls have both rods and structural steel for reinforcement. The total depth of sewage in the tanks when in use is 24 ft. 5 ins. The influent channel is 30 ins. in diameter, with the invert 5 ft. 9 ins. below water level. Three 12-in. sluice gates connect the influent channel with each tank. The effluent channel is rectangular in shape, 3 ft. 6 ins. wide and 2 ft. 6 ins. deep below the weir plates of the tank. Influent and effluent channels are built at both ends of the tanks to provide for reversing the sewage flow. The side walls of each tank are buttressed inside the tanks, and the end walls are buttressed outside the tanks. The influent and effluent channels are supported on the buttresses of the end walls. All buttresses are built about 10 ft. apart, center to center.

Each tank is divided into an upper compartment for sedimentation, and a lower compartment for sludge storage and digestion, by cement plaster partition walls forming three troughs running longitudinally through the tanks. There is a 6-in. slot at the bottom of each trough, through which the sludge descends into the lower compartment. Each tank is provided with two central gas vents, each 2 ft. by 9 ft., over each of the three bottoms, and additional gas vents are provided 22 ins. wide along both sides of the tank between buttresses.

The sludge digestion compartment was designed to store the sludge for a period of six months on the basis of a production of 7 cu. ft. of sludge per day for each one thousand persons. The sedimentation compartment provides for a settlement period for different flows as follows: For a rate of 3 000 000 gals. per day, 7.3 hours; 4 000 000 gals., 5.5 hours; 5 000 000 gals., 4.4 hours; 6 000 000 gals., 3.7 hours; 7 000 000 gals., 3.2 hours; 10 000 000 gals., 2.2 hours; and with 14 000 000 gals., the capacity of the present siphon line, 1.6 hours. The velocity of flow through the tank would be 16.3 ft. per hour with a rate of 4 000 000 gals., 20.4 ft. per hour with 5 000 000 gals., 24.5 ft. per hour with 6 000 000 gals., 32.7 ft. per hour with 8 000 000 gals., and 57 ft. per hour with 14 000 000 gals.

Dosing Tank.

The sewage flows from the Imhoff tanks through a 30-in. cast-iron pipe to the dosing tank. This tank is about 48 ft. by 74 ft. in plan and is divided into two compartments or tanks having capacities of 44 000 and 48 200 gals. The dosing control consists of two 30-in. Merritt dosing siphons and one Priestman-Beddoes air flush sluiceway 16 ins. by 96 ins., with all necessary air bells and piping. The tanks are constructed with three sides vertical and the fourth side tapered so that the larger portion of the total capacity of each tank can be discharged with a head of 8 ft. on the nozzles, and the flow would be stopped when the head is reduced to 2 ft.

The time of discharge is between five and six minutes, and the rest period between discharges depends of course upon the amount of sewage being cared for. With a rate of flow of 3 500 000 gals. per day, this rest period is about fourteen minutes. When the volume of sewage exceeds a rate of about 5 000 000 gals. per day, the air control which changes the flow from one tank to the other is checked so that only one tank is in use. As it is not intended to dose the present filter at a much greater rate than 4 000 000 gals. per day, whenever the meter indicates a rate much in excess of that, with weather conditions favorable for a large flow for some time, the attendent opens a 20-in. sluice gate connecting the influent channel in the dosing tank with the overflow channel, and thereby prevents excess dosing of the filter. The dosing tank is constructed so that it can be covered with plank or left open as may be desired.

Sprinkling Filter.

The sprinkling filter covers an area of approximately 405 ft. by 223 ft., or 2.07 acres at the bottom and 410 ft. by 228 ft. or 2.14 acres at the surface. With a population of about 35 000 using the sewers, it was decided that the present construction for about 40 000 people, so far as the sprinkling filter feature of the works is concerned, would be sufficient. This will probably be all that will be needed for filter area for five years and possibly ten years. Any additional area needed can prob-

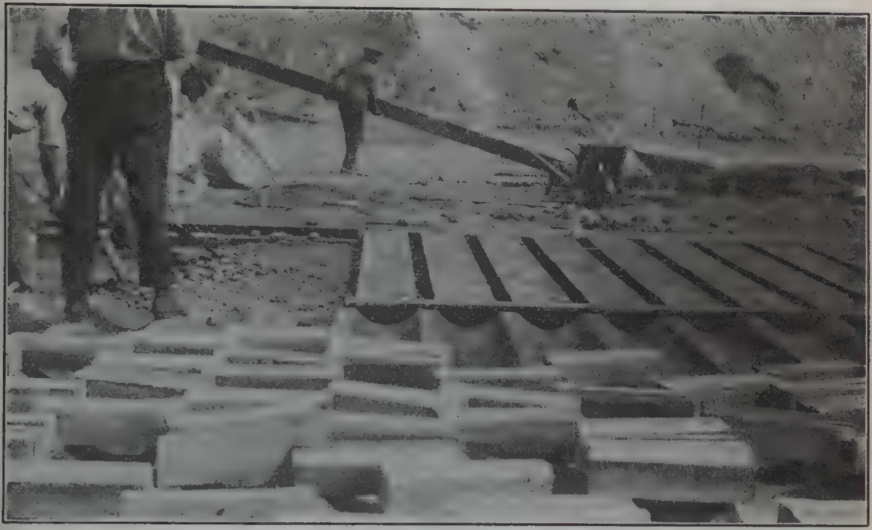

FIG. 2. FORMS, CHANNELS AND CEMENT BRICKS FOR FLOOR OF SPRINKLING FILTER.

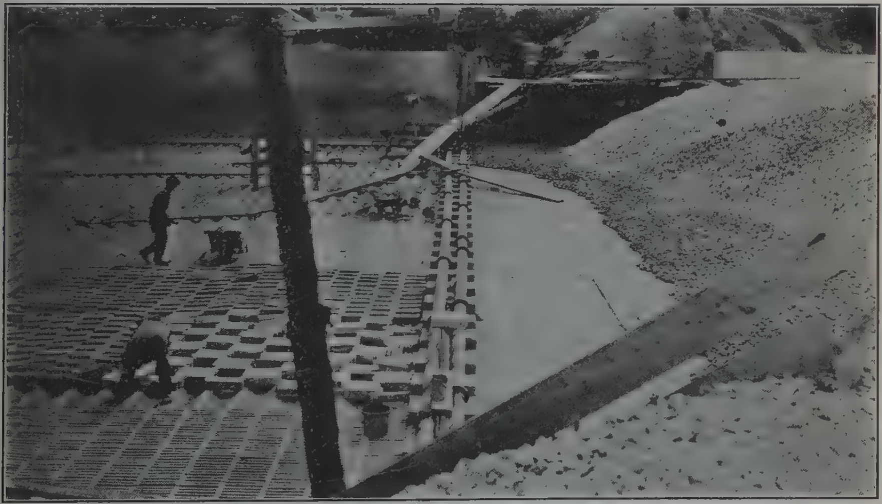

FIG. 3. FILTER FLOOR UNDER CONSTRUCTION.

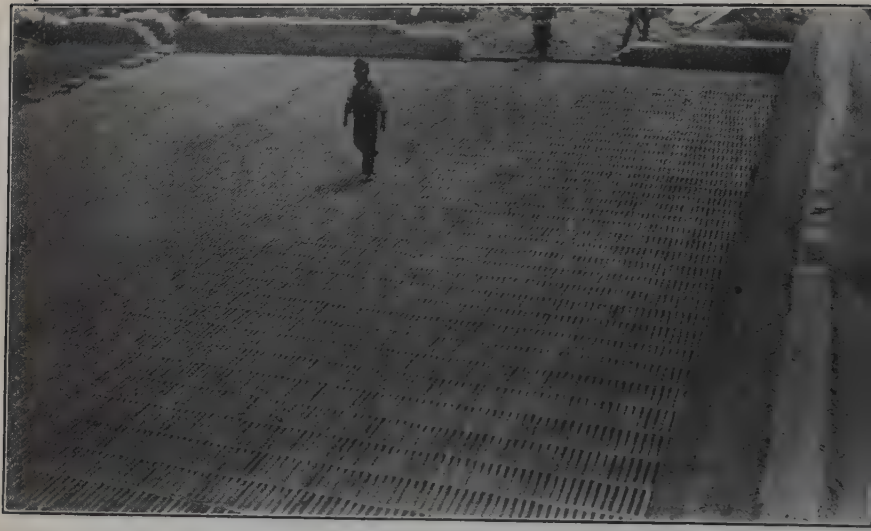

FIG. 4. FILTER FLOOR BEFORE PLACING BROKEN STONE.

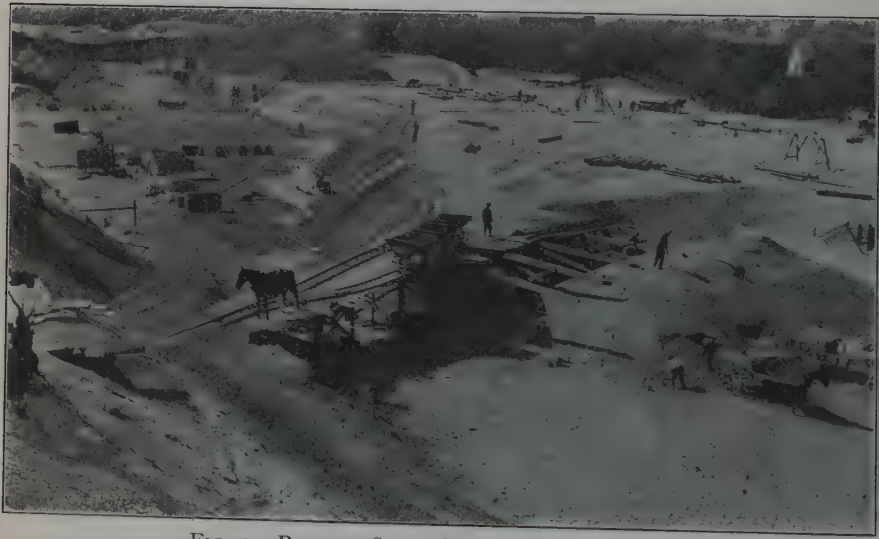

FIG. 5. PLACING STONE IN SPRINKLING FILTER.

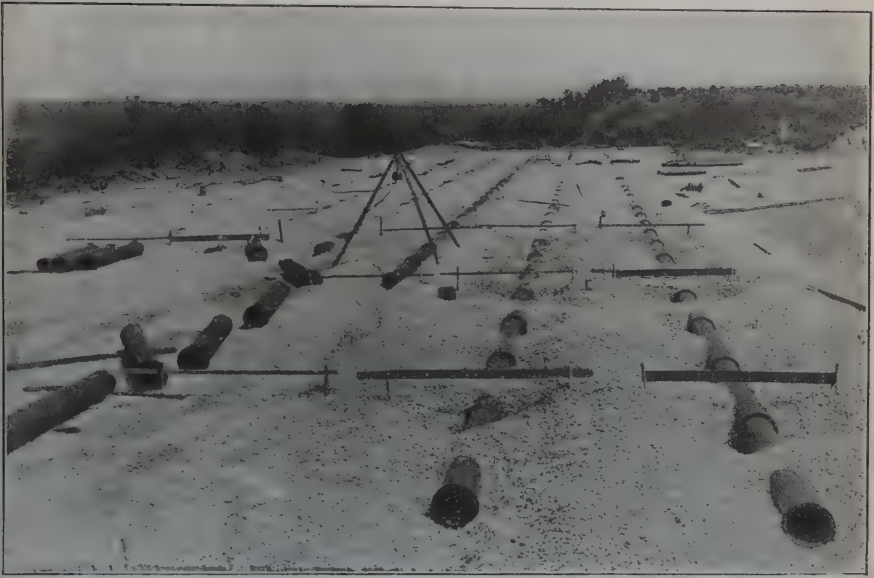

FIG. 6. DISTRIBUTING PIPES IN FILTER.

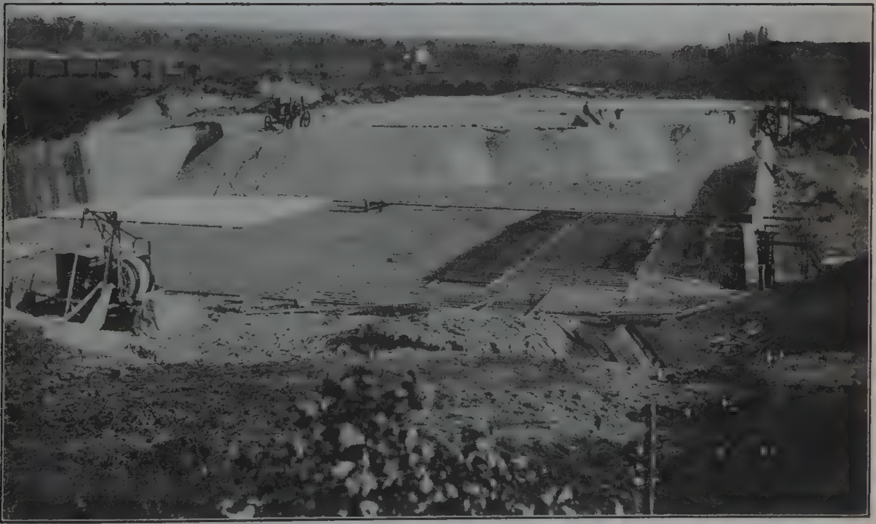

FIG. 7. SPRINKLING FILTER CONSTRUCTION.

ably be constructed as cheaply ten years from now as at present, with the saving to the city of the interest charges for such a period as the construction is delayed and the additional advantage of an opportunity for studying the operation of the two acres already built for a period of years.

The filter floor is constructed of cement concrete with Clinton wire-cloth reinforcement. The floor drainage consists of troughs or channels spaced 15 ins. on centers and having clear spans of 11 ins. and a depth of 3 ins. The depth of concrete in the floor below the trough is 3 ins. Over these troughs were placed bricks made of cement and stone dust to keep the broken stone from falling into the troughs. The stone dust was a by-product from the crusher, and was used in preference to sand, which was also abundant at the works. These bricks were made of one part cement to two parts stone dust. They are 17 ins. by 4 ins. by $1\frac{1}{8}$ ins. in dimensions and as placed in the floor the top surface measured 17 ins. by $1\frac{1}{8}$ ins. This form of floor construction provides a type having 43 per cent. of opening for drainage or ventilation. The blocks were cured about

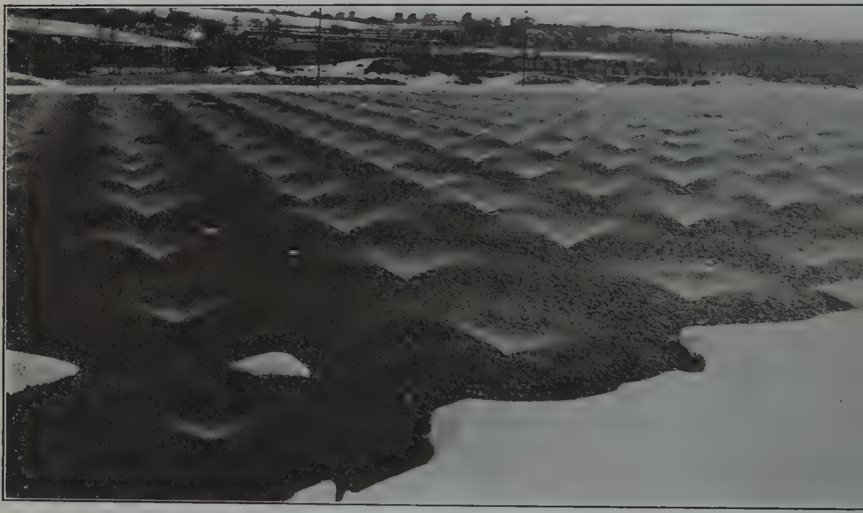

Fig. 8. Sprinkling Filter in Service.

thirty-six hours in moist air and three weeks in water. In actual service, each block sustains a total load of less than 250 lbs. Tests were made of about two bricks in every thousand, and they would break with a center load of 350 lbs. to 600 lbs., with occasionally a load as high as 1 000 lbs. In all, about 360 000 bricks were used. The floor of the filter is divided by an inspection or flushing gallery 410 ft. long into two equal parts. Each trough or channel in the filter floor has a port-hole or outlet into this gallery about 2 ft. 5 ins. above the gallery floor. The troughs or channels have a slope of 6 ins. from the flushing gallery to the collecting drains at the sides of the filter, the length being about 106 ft. A 6-in. water main, with pressure about 110 lbs., is laid in the gallery to provide water for flushing purposes.

The broken stone in the filter is from 10 ft. to 10 ft. 6 ins. in depth, and the size was specified to pass through a screen having holes 2 ins. in diameter and to be retained on a screen having holes 1 in. in diameter. About two thirds of the stone used was local granite and one third was granite and trap rock brought to the city by railroad. The quarry where the local granite was obtained is located three miles from the filter, and the broken granite was hauled in four Alco trucks. The stone was screened at the filter as well as at the crusher. During 1913 the stone was deposited in the filter by running trucks and carts directly on to the bed with plank protection, but this method was changed, and all stone placed in 1914 was by track and construction dump cars.

The distribution system consists of 17 lines of cast-iron pipe running longitudinally through the bed. These pipes are 16-in. for about one half the length and 12-in. for the remainder. They lead from a header line of 36-in. and 30-in. cast-iron pipe connected with the dosing tank. These distribution pipes are laid in the top of, and are supported by, the broken stone, the top of the pipes being just below the surface of the stone. Three hatch boxes are placed in each pipe line, and provision is made for draining them. The pipe lines are laid about 13 ft. apart on centers, and the nozzles are 15 ft. apart in each line, being staggered so that they are at the vertices of equilateral triangles

15 ft. on a side. Each of the 17 pipes has a gate, so that in case of changes or repairs only one need be shut off, and only one eighth of an acre of filter area would be out of commission. The nozzles are screwed directly into the top of the distributing pipes with no risers. The nozzles used are a modified form of the Worcester nozzle and were purchased of Matthew Gault, of Worcester.

Plaster Walls and Cement-Gun.

Thin partition walls of rib-metal reinforcing lath with cement plaster were constructed in the Imhoff tanks, to separate the sedimentation and digestion chambers, and also completely around the sprinkling filter to prevent sand and gravel from working into the spaces between the broken stone. The metal lath used was the "Rib Truss," manufactured by the Berger Manufacturing Company, of Canton, Ohio. The method of placing the plaster was optional with the contractor, either hand work or use of the Cement-Gun being allowed in the specifications. The contractor decided to use the Cement-Gun, and the result was fairly satisfactory. The plans called for a thickness of 2 ins. on both the partition walls in the tanks and the curtain wall around the filter. The type of lath used has such a heavy body of metal and such a small percentage of area of perforation that there is not as large a bond between the cement plaster on the two sides of the metal as is desirable. The limited area of this bond is such that the plaster breaks away when a not very heavy blow comes upon the wall. Again, in the Imhoff tanks, when an attempt was made to smooth the surface of the plaster by troweling, it was easily loosened from the lath. Some form of metal lath with larger openings would be preferable, but would probably require to be backed with forms to prevent the plaster from shooting through.

Secondary Tanks.

The sewage flows from the filter through a 30-in. conduit and pipe line to the four secondary tanks. These are circular in form and 30 ft. in inside diameter. The bottoms of these tanks are inverted cones with an altitude of 9 ft. 3 ins. The side walls of the tanks are 14 ft. 9 ins. high and are 15 ins. thick at the bottom and 10 ins. thick at the top. The depth of liquid in the tanks is 22 ft. 6 ins. The tanks are built of concrete reinforced with both rods and structural steel. The effluent from the sprinkling filter enters the secondary tanks through a 16-in. spiral riveted pipe connected with a cylinder of $\frac{1}{4}$-in. boiler plate. This cylinder is 5 ft. in diameter and 12 ft. long. The top of the cylinder is 14 ins. above the water surface in the tank, so the liquid must leave the cylinder through the lower end. Each tank has 24 weirs, each 2 ft. long, over which the liquid flows into a channel which is located within but at the outer edge of the tank. From this channel the liquid flows down a flight of concrete steps into the final effluent channel and then to the river.

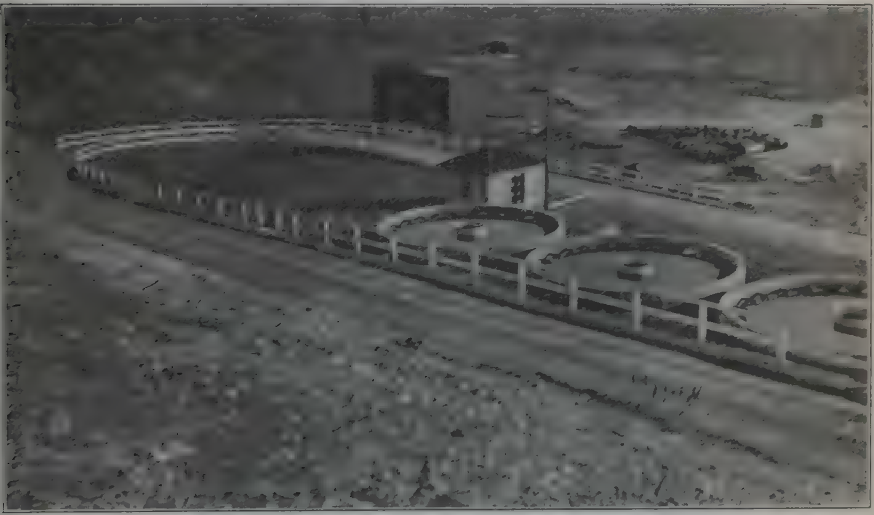

FIG. 9. SECONDARY TANKS AND ROADWAY.

Such sludge as will be settled in the secondary tanks will probably be of a character that is slow in drying and objectionable in odor, and for the purpose of caring for this sludge by the least objectionable method it was decided to pump it into the main sewer line at a point between the Venturi meter and the

Imhoff tanks. To do this work, a 5-in. motor-driven pump is installed in a small pump house near the tanks. In pumping sludge from these tanks, which will be done at frequent intervals, everything in a tank will be pumped out so that a thorough cleaning can be had if desired. The sludge from these tanks when mixed with crude sewage will probably be digested satisfactorily and all sludge at the works will be of one kind and cared for at one location.

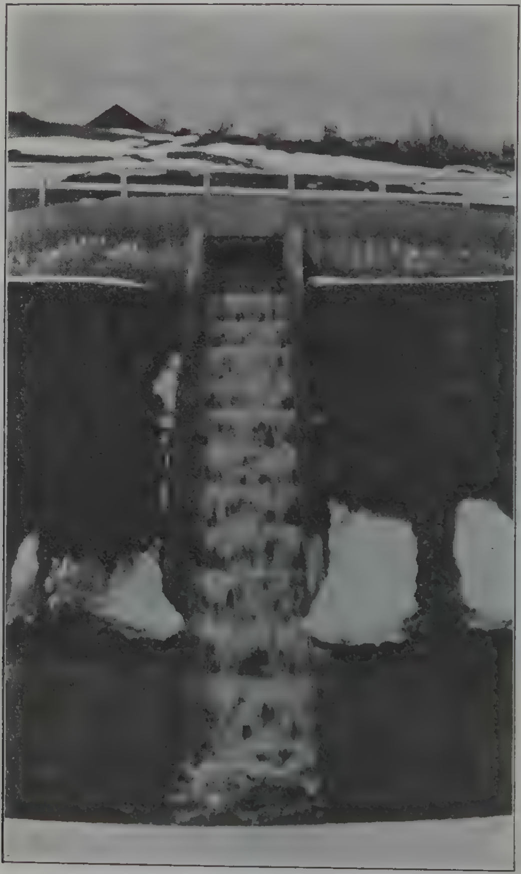

FIG. 10. FINAL EFFLUENT FLOWING FROM SECONDARY TANKS.

The difference in elevation between the bottom of the secondary tanks and the water surface in the Imhoff tanks is 47.9 ft. Between the sprinkling filter and the secondary tanks is an overflow chamber with a weir at such an elevation as to prevent overflowing the secondary tanks or flooding the filter floor or gallery. Provision in this overflow chamber is also made for passing the sewage direct to the river in case repairs or changes to the secondary tanks may be needed.

Sludge Beds and Pumping.

The location of the Imhoff tanks and filter is such that there is no area near by for a bed upon which the sludge could flow from the tanks by gravity. By pumping the sludge, a suitable location was available immediately adjoining the tanks. The sludge bed is four tenths of an acre in extent and is divided by planks into 11 divisions each about 15 ft. by 111 ft.

In order to avoid breaking up the sludge in pumping it from the tanks, it will be lifted by liberating compressed air in the sludge riser pipe near the bottom of the tank. This air will lift the contents of the pipe above the air outlet, causing sludge to be drawn into the end of the pipe. This process will allow the sludge to flow into the beds in nearly the same condition as it is at the bottom of the tank. An 8-in. sludge pipe is placed in one of the two chimneys above each of the 15 tank bottoms and a gravity flow pipe conducts the sludge from each tank to the sludge bed. The air will be provided by a motor-driven air compressor placed in the basement of the laboratory building. The total lift will be about 8½ ft. The flow of sludge can be directed to different divisions of the sludge area by operation of valves and gates as installed.

Each division of the bed will be provided with an industrial track so that the sludge can be shoveled into cars and pushed to the sludge dump. The area of the sludge bed was fixed at one square foot for each three persons. No underdrains are provided, as the material is such as to make it probable that none will be needed.

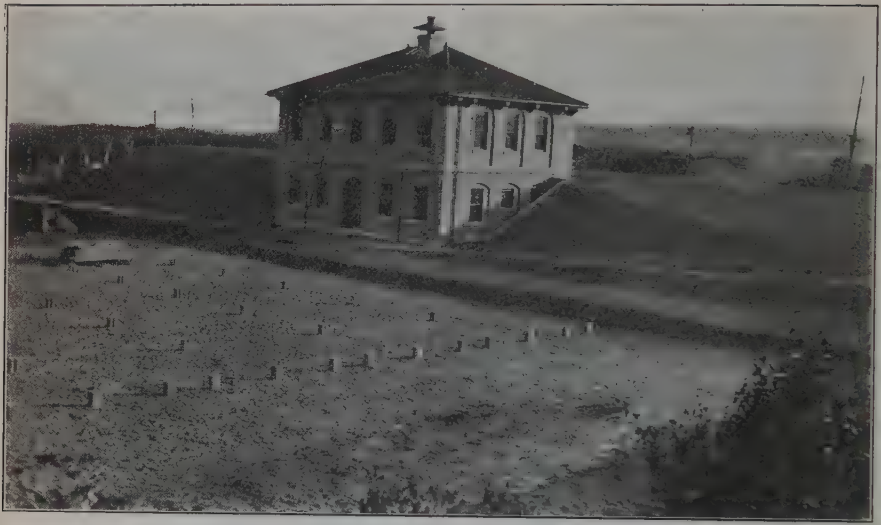

FIG. 11. LABORATORY BUILDING AND SLUDGE BED.

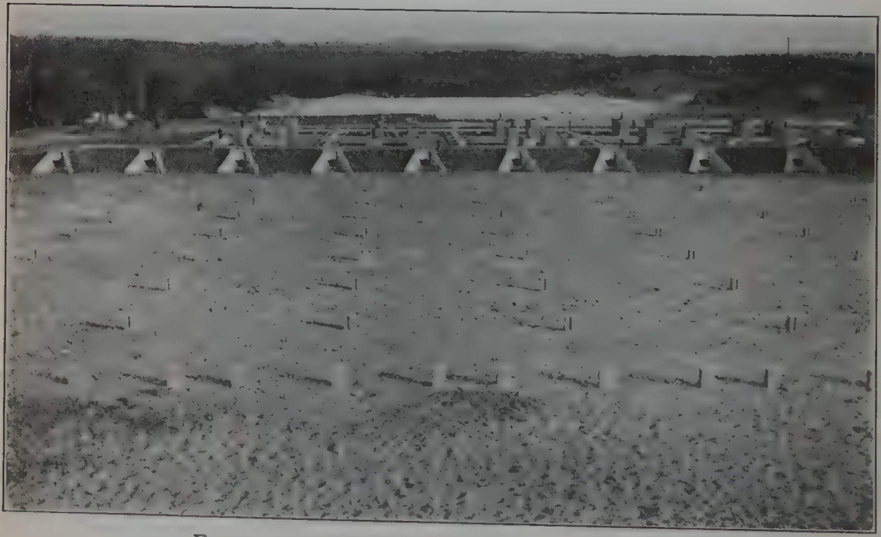

FIG. 12. GENERAL VIEW OF DISPOSAL WORKS.

LABORATORY BUILDING.

A brick laboratory building 33 ft. 8 ins. by 43 ft. 8 ins. in plan has been erected at the disposal works. It is one story high in front and two stories in the rear. The basement provides room for tools, cement testing, toilets, heating plant and air compressor. The main floor has the office and laboratories with equipment for thorough analytical study of the disposal processes of the works.

GENERAL FEATURES.

In addition to the features already described, there has been constructed about 4 000 ft. of roadway, some of which required quite heavy grading. The river channel has been straightened and improved through the disposal area, and some banks have been protected by riprap. The locations of the various features of the works are such that no pumping is necessary except the air lift for the sludge in the Imhoff tanks and the pumping of the sludge from the secondary tanks to the Imhoff tanks. The water level in the Imhoff tanks is 385.4; the elevation of the top of the sprinkling filter is 375, and the water level in the secondary tanks is 360.

Sewage disposal works are usually located in some low-lying district with naturally unattractive surroundings, and the somewhat imaginary disagreeableness of the work has led citizens generally to avoid the place and to show little interest in the method or upkeep of the works. The Fitchburg works are located largely on comparatively high land and are easily seen from all directions. To make the grounds attractive to visitors and to improve the works from an esthetic point of view, it is proposed to do considerable planting of trees, shrubs and vines and to develop the area immediately adjoining the works so as to create a park effect. This work will not require any large expenditure but will be of benefit and advantage not only to the eye of the visitor, but the tree planting will tend to lift any offensive odors that might arise at any season of the year from any portion of the works. The total area taken for disposal purposes is 116 acres, but only about 25 acres is used for the present works, and the planting and parking will be limited to that area.

The total length of the intercepting sewer is 5.57 miles, and the total fall in this distance is about 200 ft. The time required for sewage to flow the extreme distance to the disposal works is about three hours, and the time for sewage to pass through the works when the flow is at the rate of 3 500 000 gals. is about eight hours. These conditions make it possible to treat comparatively fresh sewage even with the minimum flow.

CONTRACT.

The contract for the construction of the disposal works was awarded May 15, 1913, to R. H. Newell Company and N. S. Brock, their proposal being the lowest of five received. The estimated amount of the contract was $209 027, and the bond was for $60 000. Work was begun as soon as equipment and material could be assembled, and pushed forward with vigor. As an incentive to speed, the contract provided for a bonus to the contractor provided the work was completed by October 31, 1914, and this bonus, amounting to $5 000, was paid.

The total amount of excavation was 75 500 cu. yds. and the prices ranged from 29 cents to 85 cents per cu. yd. About two thirds of the excavation was at 29 cents. The amount of reinforced concrete was 3 488 cu. yds., and the unit price for nearly all was $11.00 and $11.50 per cu. yd. The number of square yards of cement plaster partition walls was 5 900 and the price was $1.76 in the Imhoff tanks and $1.80 in the sprinkling filter. The amount of bars and structural steel used for reinforcing was 387 000 lbs., and the price in place was 4 and 4½ cents per lb. The amount of broken stone in the filter was 34 052 cu. yds., and the contract price was $1.95 per cu. yd. Cast-iron pipe, gates, valves, specials and other material were furnished by the city and placed by the contractor. The total amount of work done by the contractor by the final estimate was $233 511, which includes considerable additional work not contemplated when the contract was awarded.

Costs.

To any engineer designing a disposal works along similar lines and desiring to make an estimate of cost, a brief statement of costs of this plant may be of interest. As the matter of excavation depends upon the location and condition and would vary widely, I have eliminated all such cost in these figures. The cost of the Imhoff tanks was $52 224, which, based on a population of 55 000, would be about 96 cents per capita. The cost of the sprinkling filter was $122 990, or $58 847 per acre. Based on a population of 40 000, the cost was $2.94 per capita. The cost of the sludge drying beds when completed will be about 5 cents per capita. The cost of the secondary tanks was $8 426, or about 15 cents per capita for a population of 55 000. The cost of the dosing tank was $9 436, or 17 cents per capita. When completed, the disposal works will cost about $320 000, including cost of land, buildings, roadways and incidental work, but not including engineering and inspection. The cost of engineering and inspection for all the Fitchburg work has been 8½ per cent., which would add $27 200 to the cost, making the total $347 200, or $6.31 per capita for a population of 55 000.

Operation of Works.

While the intercepting sewer will not be completed and all connections of present outlets made therewith until July or August of this year, the works have been in continuous operation since October 15, 1914, with such a flow of sewage as came from connections thus far made. The average daily flow from October 15 to December 31, 1914, was 1 742 000 gals., and during the month of January it was 3 761 000 gals. Of this average for January about 2 865 000 gals. passed through the filter. The detention period in the Imhoff tanks has been longer than desirable, being 5.8 hours to 12.6 hours ever since beginning operation, and practically all the matter in the sewage which is capable of being settled has been settled.

The average purification during January as indicated by nitrogen as total albuminoid ammonia was 62.75 per cent. and as indicated by total suspended solids was 87.12 per cent. The per cent. of suspended solids removed by the Imhoff tanks during January was 68.6. Of the daily 24-hr. samples of final effluent taken for January, 60 per cent. were stable for fourteen days. The nitrates in the final effluent for January averaged 3.8514 parts per million.

The effect of climatic conditions on the efficiency of disposal works of this nature has led some to consider it inadvisable to construct them in a locality having at times so low a temperature as central and northern New England. During this winter there has not been the usual amount of cold weather, so nothing positive can be stated relative to temperature effects. The temperature on the mornings of December 26 and 27, 1914, was about 8 degrees below zero, which is fairly cold for Fitchburg, the coldest for the last twenty years being 17 degrees below zero. On December 28, there was considerable ice on the filter, covering perhaps nearly one half of the surface of the bed, and the secondary tanks were frozen over thick enough to sustain a man's weight. A few days afterward nearly all trace of the ice had disappeared. During this cold period there was a marked decrease in the degree of purification obtained.

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BOSTON SOCIETY OF CIVIL ENGINEERS
FOUNDED 1848

PAPERS AND DISCUSSIONS

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THE PUBLIC SERVICE CORPORATION AND THE MUNICIPALITY

By James Logan.*

(Presented March 10, 1915.)

The subject which I have taken for my talk to-night is a live one in every municipality, and is, in my opinion, the largest problem that this country has faced since the days of slavery. It is still an unsettled problem, but it has got to be settled and settled right.

First, permit me to say that I am not a corporation baiter. I am and for years have been the manager of a large corporation, knowing some of the difficulties of corporation management, and I have no sympathy with the thoughtless critic or cheap political demagogue, who pours out indiscriminate abuse upon the public service corporation simply because it is a corporation. Nor do I believe that the hot-air artist and uplifter with neither judgment nor experience will ever remedy our present evils in municipal government or that these questions will be solved by the men at the clubs, who settle these great problems offhand while criticizing men who are giving blood in service.

And let me say I want corporations to make money, and that a public service corporation which is not successful, which

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Note. Discussions of this paper are printed elsewhere in this number of the Journal. Further discussion is invited, to be received by Edward C. Sherman, Editor, 6 Beacon Street, Boston, before August 15, 1915, for publication in a subsequent number.

* Ex-Mayor of Worcester, Mass.

does not earn dividends for its stockholders, is not an asset but a liability to the community which it is supposed to serve, for the reason that an unsuccessful corporation cannot render an adequate service, and service is what it is organized for.— or at least is supposed to be organized for. We must not forget that the public service corporation has been a mighty factor in the development of our country. We are living in an age when business is done on an enormous scale, when we think and do business in large units; and the individual, the firm, or even the small corporation would be as inadequate to conduct the business of the world to-day as the old stagecoach would be to serve as a means of transportation. We are absolutely dependent on the public corporation, and the man who first invented the corporation (and it was an epoch-making invention) conferred upon mankind a blessing second only to the discovery of the power of steam.

It is trite and commonplace to say that the interests of the city and of the public service corporations are so interwoven that they must not be considered separately but together. The public service corporation draws its life from the city, and the modern city could not live without the service which the public service corporation renders. Without the corporation the wonderful development of the world would have been an impossibility. We could not have had the steamship lines which have made the ocean a ferry, the great systems of steam and electric railways, the telegraph, the telephone, gas and electric light. The corporation has been the mighty machine by which the material blessings of this wonderful century of invention have been brought within the reach of the masses, and it has also furnished employment to the millions, so that the means to procure the material blessings have been given to the great family of mankind. The corporation has been the great storage reservoir in which the small savings of the many have been gathered and then in a mighty stream have been turned into the channels through which they have flowed forth to develop a world. By its aid those of small means have had a part in this wonderful development, and without the small savings of the many, progress would have been impossible, and we would not have been able to avail ourselves of the creative energy of the great master minds of industry and commerce by which so many of the material blessings which formerly were not even within the reach of kings have now become the necessities of the ordinary man.

Now, why is it that the municipality, or the commonwealth even, is at such a disadvantage when dealing with public service corporations? The reason is perfectly simple. Many men are elected as mayors, aldermen and councilmen who know little about municipal business,— or even any kind of business for that matter,— and they find themselves opposed by a lot of trained experts who know every little trick of the trade.

In 1898, when serving on the commission for the abolition of grade crossings in Worcester, the one thing which impressed itself most strongly on my mind was the fearful disadvantage under which the city labored when dealing with the railroads. The question of grade crossings had hung over the city for years, and each time it came up, owing to changes in the personnel of the city government, it had to be wrestled with by new men who had practically no knowledge of all the past conditions, while opposed to the city were the railroad corporations which had had a continuous management for years and which had a fixed, continuous, persistent, well-defined policy. Their side of the case was conducted by the ablest talent money could hire, by men who were present at the birth of some of the problems, and had seen some of them attain their majority, and who were familiar with every stage of their development. Every move of the grade-crossing commission or city government had to be made out in the open, where all the plans of the city were known and kicked to pieces by our own people, factional, special and personal interests making breaks in the ranks of those representing the city, while on the other side was a solid front, thoroughly entrenched and protected by masked batteries, manned by men who knew every move the city had made or was to make, and who, behind closed doors, could develop their plans to checkmate the city. A decidedly unequal contest.

While I was mayor I had a conversation with a prominent engineer who was interested in our grade-crossing abolition from the railroad side and he laughed at some of the things that got by, and said the City of Worcester would have saved money if it had hired the best available expert engineers in the country to fight its case, even though it might have paid twenty-five thousand dollars or thirty thousand dollars for the service. But one of the troubles of city governments is this,— they are unwilling to pay what expert service is worth, forgetting that the best and highest grade service will usually bring the best results. The City of Worcester had a good city engineer, but this was his first real grade-crossing problem, and on the other side were a body of engineers who had fought to a finish scores or hundreds of grade-crossing problems, and who had a large experience and who knew thereby how to get what they wanted. Again I repeat, it was an unequal contest with about all the advantages on the side of the railroads, and men wonder why the railroads have their own way so much.

The real reform which we should struggle for is not only against law breaking but against law making which is against the common good. That is the seat of trouble at the present time. The special interests do these things, but the laws which they have had passed make their acts legal. Go up to the State House and see the special interests get in their work and the final results will not be a cause for wonder. They draft the bills for what they want, and the drafting of bills is both a science and a fine art. When we say they get in their fine work we do not necessarily mean that legislative committees and commissions are venal and corrupt; not at all, but we mean this,— that the special interests know what they want, are not backward about making their wants known and, when a hearing is held, the opposition is often simply an aggregation of individuals with many minds, with no concert of action and with no thought beyond the present. Arguments are made on both sides of the subject, often by men unused to legislative work, by men who are strangers to the committee or commission, and without special knowledge on the particular subject under consideration. The city rarely comes to the legislature as a unit, there is almost always faction and, on one side or the other, there is almost always a Grouch who comes to kick, and it matters not what it is, he is there with his war paint on, and that Grouch is invariably used as an asset by the special interests to make for division and the cultivation of bad blood between the several factions representing the city, and, after these men have all had their say and have for the moment stopped wrangling, up comes the trained expert and attorney for the special interests, with all confidence. He opens up his side of the story. He knows every man on the committee or commission, calls them by their given names, dines and smokes with them, and in general is on terms of intimacy with them. He has a close personal knowledge of all legislation bearing on the subject for the past twenty or more years, which the committee or even the commission may not have, and he knows what plans are being made by his clients to reach out and spike down the far future.

The hearing is ended, and the men who attended it, having made their appeals for or protests against the proposed legislation, have gone about their own business. Ah, yes, but when they went home they left that other man on the job, and the rules of his union allow him to work all his working hours, and he does; and, with his intimate acquaintance with the members of the committee or commission, he gets in his fine work, and I do not charge that he is corrupt or that he uses corrupt practices,—though we know they sometimes do,— but he creates an atmosphere that the servants of the people breathe in quite unconsciously until they think as he wants them to think. It is like a man breathing sewer gas — he may be entirely unconscious of it till his whole system has become thoroughly poisoned. The rest is easy. Under those conditions, is it any wonder that the special interests get legislation to their liking? Not at all, when we consider the manner in which legislation is wrought out. For example, a very innocent-looking bill is introduced in the legislature, and care is taken to have it introduced by a very innocent man who sees nothing in it out of the way, and who perhaps feels flattered by being asked to introduce the bill. The municipality whose interests may be vitally affected is often not consulted about it at all; in fact, it often happens that mighty good care is taken that the bill shall be introduced under such a caption and from such a source that the municipality most interested shall not be alarmed. Hearings are often held before the bills have even been printed, and at the hearings no one appears to oppose the legislation sought. Of course not. They often know nothing about it, so how can they?— but the interests that desire the proposed legislation are there in full force. The vociferous few are on the job to see that it gets by.

There are great perils confronting this republic to-day, and the most optimistic man, if he be a thoughtful man, must seriously consider them. Our fathers founded, or at least they tried to found — and many of them died in the belief that they had founded — a government "of the people, by the people, for the people," and we men of to-day must not permit our government to become a government by class, by wealth or by special privilege; and if our government has been taken away from the people by the special interests, it is our business to get it back again, and it is not going to be an easy job, but it is going to be done. At patriotic gatherings men will applaud every reference to the sacrifices made by the fathers in securing our independence and to the sons for maintaining the integrity of the Union, but the moment some people are asked to sacrifice anything themselves for the public good, they are either too busy, too lazy, too indifferent, too fond of their own ease and comfort or too fond of the almighty dollar to even entertain the proposition and give it one serious thought. They appear to assume that good government can be secured and maintained without any effort and without sacrifice, but they are eternally wrong. No step of progress has ever been made that has not been paid for by some one, and paid for with blood; and if we are to have political freedom some one must pay the cost by rendering service even if the price demanded is personal inconvenience. The men who fought in the Civil War on both sides fought for what they thought was right — and the women who stayed at home and suffered — were a nobler generation than ours, for they gave all they had, even life itself, for an ideal, and we need that to-day both in our business and our civic life.

Many men who are competent, who are able and who have no private interests to protect or advance, will not render service to the city or state, and these, with the men who remain away from the caucus and the polls, are largely responsible for present political conditions. The men with special interests are on the job all the time, and the neglect of their political duty by so many is the great opportunity for the special interests to get what they want.

We hear much about franchises for public service corporations, and Tom Johnson, a former mayor of Cleveland, said, "The only good franchise is a dead one." The National Electric Light Association said, "The only good franchise is a perpetual one." Some claim that short-term franchises, others that the indeterminate franchises, will solve the problem, but there is one thing that is certain, and that is, that no matter whether franchises are limited as to time, perpetual or indeterminate, as some one else has well said, "The most important features of franchises are the things that are missing, that are not in them." You know in the past the exploiter of the public has acted on the theory that whatever is not nailed down is his, and that he has often amended along this line,— that whatever can be pried up is not nailed down. The public service corporations claim that the indeterminate franchise is the real thing, but what a howl they would put up were the public to ask them to make a change and take indeterminate franchises for the so-called perpetual franchises that they now hold. I say "so-called perpetual franchises" for I have a distinct feeling that some day the people will say that the men who, in their ignorance, gave away the future gave something that did not belong to them. I am minded to make a quotation from a recent address of Delos F. Wilcox, of New York, at a meeting of the American Academy of Political and Social Science in Philadelphia. He said: "The principle of state regulation by permanent commissions was put forward in this country a few years ago as a statesmanlike method of protecting the people from the exactions of the public service corporation, while at the same time giving the corporations a fair deal. We now find that all the corporations have been converted to the idea of regulation. They not only welcome it, but insist upon it. They are so enthusiastic over it that they help write the laws and even sometimes appoint the commissioners."

It takes a good while for a specialist to see all the things that have been left out of or put into a franchise, and the layman, whether he be a public official or a plain business man who happens to be rendering service, is apt not to see some of the holes at all, until he has fallen into one of them; and it can be said with truth that great care has been used in the preparation of the holes. The early franchises granted by city governments were very simple, and contained practically no conditions. When those early franchises were granted, the city desired the service which the corporations were to render fully as much as the corporations desired the franchises. They were, in the main, granted to public-spirited citizens who had at heart the development of their town or city by furnishing modern improvements, and, incidentally, to make a fair dividend,—but the main thought in those early years was Service. To-day the proposition is more often than otherwise worked from the other end of the problem, the business of the corporation being to exploit the city for dividends, and too often with not so much regard for service.

In those days, when towns and cities were smaller, the giving of a franchise to some citizen by the city fathers was a matter between neighbors and, as it was not going to cost the town or city anything, and it looked as if it would make the place more up-to-date with a car line than without it, they gave their neighbor the franchise. In some cases it was for a hundred years and in some cases forever, and the men who gave it away did not know what they were doing, and the man who got it did not know, as Booker Washington would say, " what had fallen to his pile," for it really had no value at that time.

The franchise which gives the present Consolidated Street Railway Company its rights in the streets of Worcester was originally granted to the Horse Car Company, a corporation made up of a few public-spirited citizens who organized the company not to exploit the city but to render to the city a public service. No one thought much about conditions then; the interests were local and they were dealing with friends and neighbors, and the mind of man could not at that time have framed conditions to cover a modern franchise for 1915. In those early days franchises were very loosely drawn, and as an example let me read the first street railway franchise granted to the horse car line in the city of Worcester, which is simply a report of a committee on the part of the Board of Aldermen.

"City of Worcester in Board of Aldermen, October 6, 1862.

"*Gentlemen*, the committee to whom was referred the examination of the proposed location of the Horse Railroad have attended to that duty and beg leave to report in favor of that location according to plans and specifications submitted by the corporation, and accompanying this report, to wit as follows:

"Commencing by a main track and spur at a point in Lincoln Street nearly opposite Harrington Avenue, then proceeding through the middle of the street to Lincoln Square at a point nearly opposite Salisbury Mansion, where it is proposed to have a turnout and spur, then passing on in the middle of the street to a turnout nearly opposite old Market Street. Thence passing on through the middle of Main Street to a turnout opposite the Quinsigamond Bank, then passing on through the middle of Main Street to a turnout opposite the Mechanics Hall, then passing on in the middle of Main Street to the intersection of the Pleasant Street and Front Street branches, at or near City Hall, then passing on through the middle of Main Street to a turnout nearly opposite Oread Street, then again passing on in the middle of Main Street to a turnout nearly opposite Freeland Street, thence passing through the middle of Main Street to the termination in a spur and main track at Webster Square nearly opposite the store of Albert Curtis.

"The corporation desire to reduce the hill at New Worcester, if found necessary, five feet more or less, and will do so under the direction and control of the Committee of Highways, which proposition meets the favorable consideration of the committee. The committee also report in favor of the proposed location of the branches — that in Front Street commencing at or near the Western Railroad Station by the main track and spur and passing through Washington Square to Front Street and through the middle of Front Street to its intersection with the Main Street track at or near City Hall, and that in Pleasant Street commencing by a main track and spur nearly opposite West Street and passing through the middle of the street to its intersection with the Main Street track at or near City Hall, all of which is respectfully submitted.

(Signed) Merrick Bemis.
Chas. B. Pratt.

"The committee will also report in favor of granting to the corporation all necessary privileges for constructing and operating the Worcester Horse Railroad."

(Signed) Merrick Bemis.
Chas. B. Pratt.

A copy. Attest:
(Signed) W. Henry Towne, *City Clerk.*

You will note that this report recommends granting to the proposed horse-car line a location on Main Street and on our two next most important streets, Front and Pleasant streets, and you will note *there is not one single condition named in the franchise*. The committee having signed the report, then adds a postscript in the form of a blanket clause which says,— "The committee will all report in favor of granting to the corporation all necessary privileges for constructing and operating the Worcester Horse Railroad," and the record of the Board of Aldermen says,— "Report accepted and recommendations and locations adopted."

There is not a word in that franchise which says that it is to be like the laws of the Medes and Persians, that can never be changed, but subsequent legislation changed it very materially in the interest of the public service corporation when there was taken from the city the right to control its own streets and that control was given into the hands of a public service corporation acting under the rulings of the Railroad Commission at the State House, for that is practically what has been done. Of course I understand that the streets of a city are under the control of the Commonwealth, and that in voting franchises the aldermen act not as aldermen for the city but as state officers for the Commonwealth to grant the franchises.

The law is contained in Section 64 of Part III, page 463, of the Acts of 1906, as amended on page 417, Section 11, of the Acts of 1909, and says,— "The Board of Aldermen of the city . . . may grant a location for the extension of the tracks of such company and prescribe how said tracks shall be laid. and the kind of rails, poles and wires and other appliances to be used, but [and here is the nub of the whole proposition] *they shall impose no terms or conditions to such grant in addition to those imposed by general laws on street railway companies in force on the first day of October, 1898, or such as may have been imposed in the grant of original location*." By that act, the public service corporation being in the pasture, the bars were now put up so the city could not get in. In other words, it mattered not how great a blunder might have been made when the original grant of location was made, the municipality could not amend the old grant nor could it impose any other conditions in any extensions of the lines, but must go on perpetuating the old blunder, surrendering rights in other streets for all time, simply because the Board of Aldermen in 1862 did not have the superhuman power to draw aside the curtain and look into the future. But, in my opinion, not one member of that Board of Aldermen in 1862 ever dreamed that he was granting perpetual rights to the Horse Car Company in the streets of Worcester. That is what has been read into the grant of the franchise by subsequent legislation and by rulings of the Railroad Commission which was established in 1868 with practically no power as one of its foundation principles. Its power was to be exercised through reason and the creation of a sound public opinion, and that was why it was not given autocratic authority. The hope of the framers of this legislation was that public opinion would be the strongest power for control.

Let me repeat. In 1862 the City of Worcester, through its Board of Aldermen, granted a location in the streets to the gentlemen who organized the Horse Car Company, and the grant of location covered certain streets (but only those streets), and the law now says the conditions in that grant cannot be changed. Granting that, for the sake of the argument, it would be just as much right to say that, because the company used horse cars to begin with, it could never use electricity or anything else. But it does not stop by saying the city cannot change the old franchise. The special interests have, by subsequent legislation, had read into it changes which materially alter that old grant, by saying that no conditions can be imposed on any extensions of the lines other than those named in the grant of original location, so, because in the distant past the representatives of the city government gave a "jug handle" grant to the Horse Car Company on certain streets, the city can never make any new conditions for extensions in other streets, except on the "jug handle" basis, which means giving both handles to the public service corporation. That may be good law, but it is poor common sense, and it is not justice even if the grist was ground out in the atmosphere of the sacred codfish.

The only value that a public service franchise has is given to it by the people whom it is supposed to serve, and I use that word "given" advisedly because it is a word which accurately describes what municipalities have been doing in the past, and it is high time that the gift enterprise should come to an end. We have in the past been far too generous for our own good. For the future we must be more careful and preserve for our children's children the remnant that is left of the unearned increment in our streets which belongs to them; it is not ours to give away.

Some years ago, in a conversation with Mr. John Hays Hammond, the celebrated mining engineer, I referred to the old Gloucester fisherman who owned a long strip of shore line near Gloucester, and who, when dying, said to his son, "Don't sell any of the shore line, because there will be a lot more people here, and God Almighty has got all through making shore. There ain't going to be any more of that." Mr. Hammond said,—"You have just made the finest conservation speech that I have ever heard, for in a few words you have told the whole story of conservation." There will be a lot more people here and God Almighty has got all through making some other things besides shore, and some of those things that he has completed belong to all the people and not to any special interest.

A franchise is granted to a public service corporation for two purposes, one of which is stated, and the other, while not stated, is understood: First,— to render service to the community. That is stated. Second,— to make profit. That is not stated, but it is understood. In granting a franchise the statement is always made that the reason for granting the franchise is "public convenience and necessity," which fundamental fact is too often lost sight of as soon as the franchise is granted. It is never stated in a franchise that it is granted to the promoters of the enterprise that they may make enormous profits to be divided in dividends or to be put into the plant to create and enhance the value of the stock of the corporation, the value of which is created by the public by whom the franchise has been given.

What gave the franchise its value? The people who bought the goods, whether water, gas, electricity or transportation. They are the ones who created the values and also that intangible asset called good-will, and the public should not be compelled to pay enormous dividends on its own creation. In an industrial enterprise the conditions are entirely different; the merchant or manufacturer has keen competition and that will determine his return on his capital, and if you do not like his service or prices you can trade elsewhere; but this is not so with public service corporations — you must take their service and pay their price, whether you like it or not. The case would be entirely different if these public service corporations could be controlled by competition, such as regulates ordinary business or commercial corporations. From the existing conditions these grants must in the very nature of things be monopolies or practically monopolies. A city cannot grant franchises to a half dozen street railway companies, telephone companies, gas companies, electric light and power companies, to tear up its streets at their pleasure. To do this would invite a competition that would kill, for competition may be the death as well as the life of business, and in the end the city would have to pay for a duplication of plant and equipment, maintenance and operation, which would mean economic waste. This would mean a competition that would in the end lead to bankruptcy, the bankrupt corporation being bought up by the successful corporation, and the investors in the former would have lost their money and in the end the people who were served by the successful corporation would be called on to pay for the killing, for they would be obliged to pay dividends on the investment which the successful corporation had to make to pay for the killing and burial of their unsuccessful rival.

Now, just because these grants of franchises are in the nature of monopolies, the investors are protected from the competition that kills, their dividends are more sure than in very many industrial enterprises in which investments are made, and, being so protected, they ought to be so supervised and so controlled that they cannot exploit the public as they have done in the past. The financial risk in many of the public service corporations is not now what it once was. The investment is no longer more hazardous than general business, and these enterprises have become as stable as any human institution can be, and with limited risk the dividends should also be limited.

Now to go back a little. The men who were serving the cities in those early days had no conception of what changes the future would develop, nor did any one else. Men's views were local and they thought in small units, and it is probably true that not one man in a hundred to whom those early franchises were granted ever made a dollar out of one of them. In a multitude of cases those early ventures were failures and the franchises of bankrupt horse car lines were put on bargain counters and marked down, down, down, to next to nothing, and went begging at any price. That is what happened in Worcester. The whole outfit, franchises, trackage, car barns, and rolling stock, in fact body and soul, was sold in 1869 under an order of the court for thirty thousand dollars, and you will note I say it had a soul that went with its material equipment in 1869.

You have no doubt heard men tell, as I have, about the risks of the business, about the large amounts of capital that were sunk in those pioneer ventures, but it is not the men who are in control, to-day, who lost the money, so don't waste sympathy in that direction.

About this time that smooth proposition, the promoter or exploiter, was born. The man with imagination plus, with a vision of future possibilities, the great exemplar of faith which the Apostle Paul in his inspired definition says is " The substance of things hoped for, the evidence of things not seen." And so, as Brand Whitlock, former mayor of Toledo, Ohio, once said, " The promoters fell heir to the enormous social values that were being created in cities, not by the promoters but by all the families who moved in and toiled and wrought and built up the modern city." Now the promoter or exploiter is an oculist. He is a specialist in his line, for he shuts some men's eyes and opens others, and about this time he opened the eyes of a set of men who were just beginning to see that there was, or at no distant date there would be, money in the electric-railway business; and they were, in their line, just as shrewd and sharp as the promoters of the financial interests behind them. These promoters or exploiters were often the political leaders and in some cases the bosses behind the throne, who sometimes selected mayors and aldermen, but whose names did not appear on the ticket of any political party at elections, although they sometimes were the invisible government, just the same. These men were quick to see the power which they held, and as they needed money to use in the business of maintaining a grip on the local political situation they were not slow to grasp their opportunity to work for the financial interests. And so politics became a large factor in the public business as an ally of the special interests, and the era of speculation in public service properties and securities was ushered in, and out of these exploitations vast fortunes were piled up with all the evils and low morals which usually attend the making of easy money.

These exploiters now, like Alexander, sighed for other worlds to conquer, and the cancer began to spread. To get what they wanted it was necessary to control " the powers that be," the powers that granted favors; and the same sordid sickening drama has been enacted all over the country. When you follow the trail of the corrupt politician to his usual place of business you will usually land in the directors' room of some corporation behind closed doors with the curtains pulled down. Wherever politics has been rotten, business has furnished the infection, and it has too often been transmitted by the man whose large power for evil was his cloak of eminent respectability.

I have heard men say business was cleaner than politics. I do not agree with that statement. In fact, they are one and the same thing. I don't know where or how there could be corrupt politics without a close business connection. If there were no corrupt business men to do the bribing and buying there would be no bribed and bought politicians. The grafter, Abe Ruef, in San Francisco, who is now doing time in San Quentin, was not a cause, he was simply the effect. The cause lay back of him, and it was a traversty on justice to send him to jail and allow the officials of the Southern Pacific Railroad and the United Railroad Company of San Francisco to go free, and it is that brand of so-called justice that is the cause of a large amount of the present unrest all over the country. Men have a feeling, and they have a right to it, that there are two laws in the land, one for the man who steals a dollar and another for the man who steals a million.

It was the special interests at Pittsburgh, Philadelphia, Cincinnati, San Francisco, St. Louis, New York and some places nearer home, that were responsible for the bad local political conditions. The special interests were represented by the solid business men who furnished the money to do the bribing. They never did it themselves. Oh, no, they were too respectable to do more than furnish the money, but if some of these men of eminent respectability, but with dirty hands, had been compelled to wade through the filthy stream themselves, they might have sized up their rottenness. Such men are more to blame than the weak bribe-takers, who, for a mess of pottage, barter away the rights of the people. Special privilege sees to it that men are elected who can be serviceable. They are elected because they can be handled, and the people get just what they bargained for and what they deserve when they allow these conditions to exist, and they often exist because men like you fail to do your duty, in the rendering of service.

Worcester is a clean city politically, and if the great Apostle Paul were living in it, he could say with truth, "I am a citizen of no mean city." Yet in 1910, one of the aldermen told me — and he repeated on the floor of the Aldermanic Chamber — that a man who was connected with the Consolidated Railroad came to him and named three members of the Board of Aldermen who would be satisfactory to the Worcester Consolidated Street Railway Co. for president of the Board of Aldermen. Well, we saw to it that none of the three men who were so nominated or suggested were elected. There was no attempt at bribery; they simply wanted a man as president of the Board of Aldermen who would be friendly to their interests, and were not backward about making their wants known.

It is the same old story. From the beginning of time, private interests have always been vigilant, while public interest is allowed to remain anybody's, everybody's and consequently nobody's lookout. For example, in October, 1910, a hearing was held before the City Council of Boston on the petition of the Elevated Road to carry baggage and freight through the streets of Boston and for the erection of a large trolley freight terminal, and, if the press reports were correct, it was the most slimly attended hearing held in the city for years. According to the

Boston *Post* of October 15, 1910, " but six persons not directly interested appeared, and but one of these, Mr. James H. Brennan, of Charlestown, spoke in opposition to granting the franchise, he making the charge that a scheme to form a gigantic trolley express trust was behind the petition." Not another person in public life save the members of the Council were present, nor did a representative of any organization or association, with one exception, appear, to speak on the matter either for or against. The only person, beside the railroad representatives and Mr. Brennan, who addressed the Council was Mr. Joseph B. Eastman, secretary of the Public Franchise League, who has just been appointed by Governor Walsh as a member of the Public Service Commission, who said he thought his organization would approve granting the franchise with certain restrictions as to the time and methods of operating the proposed trolley express. That is a fair sample of the interest of the public in their own business, and under such conditions is it to be wondered at that the municipality gets the hot end of the poker handed out to it?

Often, after a bitter contest, a franchise is granted to a public service corporation, and, in a few years, the mayor, and every man in the Board of Aldermen and Common Council, and many of the heads of departments, having served their terms of office have stepped out and the new men in the City Council have no knowledge whatever of the conditions named in the franchises under which the corporations are operating. They have never seen them, have never heard of them, and have never given the matter even a passing thought. All the conditions have been forgotten, as the public service corporation expected they would be forgotten, and the corporation does as it pleases because there is no one with a knowledge of the facts and conditions continuously watching after the interests of the city. There is not a firm or corporation in existence that would be successful under such conditions.

The public service corporation sometimes rides rough shod over a community. I had one case of this character while mayor of my city. The decree of the court for the abolition of the Southern Railroad grade crossings in Worcester was passed before I became mayor, but the work had not been started. When this matter was before the courts, as I understand it, the contention of the New Haven Railroad was that as Jackson Street was not to be touched there should be no land damage or consequential damages in connection with that crossing. But in working out the engineering details, following the lines laid down by the order of the court, it was found that to put in the foundations of the Southbridge Street bridge it would be necessary to take possession of a considerable portion of the Jackson Street location. Neither the engineers of the New Haven Railroad or the contracting engineers who were doing the work said a word to the mayor or city engineer, but they quietly laid their plans to take possession of the street, and accumulated on the railroad location adjacent to the work the proper machinery with supplies and material for putting in the concrete foundations, taking good care to make no move which would attract attention until after one o'clock Saturday, after all the courts had adjourned, so that there was little likelihood of an injunction should the city learn of their plan and try to stop it. About 10 P.M. on Sunday, I was asked by telephone if I knew what was being done at Jackson Street, and replied that I did not. I was then informed that the street had been fenced off and the foundation of the bridge, which took up about a third of the area of the street, was well along toward completion. I called the street commissioner and sent him down to see what was being done, and about midnight he reported as I have just stated. I then asked the city engineer, street commissioner, assistant city solicitor and chief of police to meet me at Jackson Street crossing at seven o'clock Monday morning, and about eight o'clock we located the contractor and I ordered him to stop work at once at Jackson Street and was informed by him that he did not take his orders from me; his orders were to put in the bridge; to which I replied, "You will take orders from me this morning." I then ordered the chief of police to arrest every man on the job for trespass if they did not stop work at once, and they stopped. I then had the street commissioner call in from different sections of the city about seventy-five men of his department and at 1 P.M. we moved on the works and tore down the concrete walls, threw the boards, etc., over on to the railroad location, destroyed the concrete foundations which had been put in and which were hardening and said to the contractor, "It is your move." Inside the next forty-eight hours I had an agreement with the New Haven Road to buy for them the necessary land to take the place of the land taken in the street, and they would construct for the city as good a street as the one they had taken possession of.

For some time prior to my administration as mayor, the Consolidated Street Railway Co. had been trying to secure a franchise for carrying freight and express through the streets of Worcester. In 1907 the Board of Aldermen had granted such a franchise, and my immediate predecessor had vetoed the grant of the Aldermen because there was no time limit specified in the franchise, and this was one of the issues in the municipal campaign of 1907 when I first became a candidate for mayor. In my first inaugural message in January, 1908, I stated with considerable clearness my creed in regard to public service franchises, and after four years of experience as mayor, I would not now modify but would make stronger, if possible, the five articles in that creed. Permit me to restate them:

First, that the streets of the city belong to all the people of that city, and that no mayor or city government or state commission has a right to barter them away.

Second, that the day has forever passed when any city should grant a perpetual franchise of any kind whatever to any public service corporation.

Third, in granting a franchise for a term of years it should be the shortest possible term that would allow the corporation proper time for development, giving to it a fair return for its development and on the actual capital invested in the enterprise.

Fourth, that the time to attach conditions to a public service franchise is when it is granted, and that the city ought not to be forced to plead for that which is rightfully its own.

Fifth, that the mind of man cannot to-day frame a franchise naming conditions which will cover even the next ten years, to say nothing of protecting the far future, and for that reason perpetual franchise ought not to be granted, for nobody to-day can foresee what the future may have in store in the way of increased demands upon our public streets.

During the entire four years of my administration the subject of a trolley freight service was under consideration and, as I remember the circumstances, the trolley line had secured franchises on every trolley road up to the city limits, but the aldermen and mayor of Worcester, while desiring to grant the franchise with a reasonable time limit, had not been able to make any progress because the city, through them, insisted that there should be written into it a time limit (the suggestion being fifteen or twenty years), so that with the development of the next twenty years, if conditions were to arise which no man was wise enough now to foresee, there should then be a new deal based upon experience and upon the new conditions then existing.

The trolley company put up a plea of the enormous expenditures of money required to put the trolley freight service in operation, but when we began to investigate we did not find the occasion for enormous expenditures. The tracks, wires, poles and the complete organization were already provided, and all that was needed was a few cars and a freight depot. I said at one of the hearings at the State House that I could anticipate difficulties in the future for the trolley express company by *having* a time limit fixed, in the franchises, but I could also anticipate very serious difficulties for the municipality in *not* having a time limit fixed, and I trusted that while I approached the subject with an open mind I might be permitted to suggest that aldermen and mayors were elected to safeguard, as far as they were able, the interests of the city. The trolley companies did not need them to look out for their interests, for they had shown wonderful ability to take care of themselves.

When we had a hearing on this matter before the Massachusetts Railroad Commission, or before a legislative committee, I have forgotten which, and the attorney for the trolley road suggested that they did not know what kind of a mayor and board of aldermen the city of Worcester might have in twenty years, my reply was that the trolley road was evidently afraid to trust the future representatives of the city, but with the experience of the past twenty years fresh in our minds, it required some nerve to suggest that the city must surrender its rights to the trolley road and trust them entirely for all time.

While this contest was on I was reminded a good number of times that if I had aspirations for other political honors I was driving nails in my political coffin by carrying on this fight. Well, I had no other political aspirations, so I kept on the job. We were advised by the Railroad Commission that under the present law it would not have the right to approve a limited franchise, and my reply to that was, "Then let us have the law changed." Knowing the influence which put the law as it now is on the statute books we have got to put an end to public service corporations or any other corporations or special interests writing up the laws for their own control. There has been too much of that done already.

At a conference with the chairman of the Railroad Commission in October, 1909, when I was reminded by him that the Consolidated Street Railway Co. could go past the city to the Commission and get what it wanted without the consent of the Board of Aldermen, I said, "Well, I am glad there is still a Supreme Court to go to in Massachusetts." And the reply of the chairman was, "There is no way to get your case before the Supreme Court, Mr. Mayor; the Commission is in a sense the Supreme Court in this matter. The only way to get a change would be to change the law, and with the railroad interests so dominating at Boston, it is hardly possible to expect to get that done."

The Railroad Commission took the position that under the existing law they would have no legal right to grant a limited term franchise. The city solicitor submitted to the Railroad Commission a brief and asked the Commission to agree with the city on a statement of facts so that the City could bring the precise question at issue before the Supreme Court for a ruling; but the brief was practically filed and that was as far as it ever got.

A trolley freight franchise was granted by the Commission on December 4, 1911, without a time limit but with a proviso that should the Commonwealth in the future grant franchises with a time limit the city of Worcester had not lost its right in the premises, and that was all we saved out of a five-year fight, when I think every man in the Board of Aldermen and the mayor wanted to grant the right, but not in perpetuity.

Now, while we, as chosen representatives of the city, were waging that contest to maintain the natural rights of the citizens of Worcester that were yet to be, did Worcester come down to Boston as a unit? No, she almost never does. We presented a divided front as usual, and one faction for the privilege of selling a few more goods annually in Worcester County were willing to part company forever with God-given rights which were not theirs to give away. We can always be generous with what belongs to some one else. These rights belonged to the generations yet unborn, but the petty special interest of to-day was larger than the common good of the far extending future. Remember, the public service corporations are not the only special interests looking out for themselves.

It was my intention to tell you something about my long contest with the Worcester Electric Light Company but I found that in the preparation of the material for my paper to-night I had cut down more timber than I could trim out, so that I can only briefly refer to that contest which lasted from December 7, 1910, when I entered my complaint, to July 10, 1912, when the Gas and Electric Light Commission rendered its decision. It is a very interesting and instructive story and would be entitled to a whole evening; for it was an epoch-making contest, and I never could have made the fight had I not taken the bit in my teeth. If I had brought the matter to the attention of the City Council, the powers that be would have got busy with the members and I would have been checkmated. Let me explain what I mean.

I began my investigation in January, 1909, and in March I had gone far enough to be conscious of the fact that I needed expert knowledge which I did not possess, so I asked the city solicitor if I had the right to employ an expert without going to the City Council for authority to do so, and then I outlined to him my interpretation of the City Charter. I might add our charter was granted in 1893, and while, like all the works of man, it has its imperfections, it has been a good charter to work under. It says that when the City Council has appropriated funds for any of the departments of the city, such funds shall be expended by the head of the department under the direction of the mayor, and that every contract in excess of three hundred dollars must have the approval of the mayor in writing. In like manner, when the City Council has appropriated funds to the general expense or incidental account, such funds are to be expended on the order of the mayor. I therefore asked the city solicitor the question, "To whom does the mayor go for approval of his expenditures from this account?" The city solicitor said my interpretation was right and I had a legal right to expend the money for expert assistance if I was willing to take the responsibility. As I was not going after this game with a brass band I didn't intend to ask for the authority of the City Council to do what I already had a legal right to do, and then find myself checkmated by the Electric Light Company, for were I to ask for the authority I knew the special interests, so to speak, would throw a monkey-wrench into the machine and put it out of commission. They would get busy the very next day with the members of the City Council and then we would hear the wail about wasting the "peepul's" money, and the powers that be would see to it that all the watch dogs of the treasury were on the job to save the city's money. That would be the claim, but the motive would be to prevent an investigation by not granting the sinews of war.

After I began my investigation and, in due time, it became known that I had an expert at work, there was newspaper opposition. It was stated that the mayor was spending money without leave or license, without any authority from the City Council, but I refused to discuss the matter through the press and kept right on the job.

Now for the vindication of that course. A little later in my administration we were having very poor service from the Consolidated Street Railway Co., and the president of the Board of Aldermen, who was chairman of the Street Committee, introduced an order to employ an engineer to examine and report to the City Council in regard to the equipment, power plant, etc., of the Consolidated Street Railway Co. The chairman of the Board of Aldermen brought to me the order before it was introduced, and I told him I could pay for that investigation out of the incidental account, which could be expended on the order of the mayor if I so desired, but I said, "You go ahead and this will vindicate my position in not asking the City Council for authority to hire an expert in the Electric Light investigation." His original order called for an appropriation of one thousand dollars, which he finally offered to reduce to five hundred dollars in hopes to get it through, although that would not have been sufficient to pay for any investigation worthy of the name. Did he get the amount asked for? Not one red cent. The powers that be got busy and the representatives of the people, the watch dogs of the city treasury, howled about throwing away the "peepul's" money, and two of the aldermen whom I referred to earlier in this paper, who were satisfactory to the Consolidated Street Railway Co. for president of the Board of Aldermen, voted against the order to appropriate the money, and there the matter practically died and there was no investigation worthy of the name; but that abundantly vindicated my course in not asking the City Council for authority to do what I already had a legal right to do.

The foundation of our government is assailed by two forces which are at the opposite extremes of our political life. Many of the people see only the danger from the low-down grafter, who would, through the cheap politician, by corruption and through the aid of the saloon, control the political destinies of town, city, state and nation. But there are other enemies which have been doing their work against the interests of the public. These men are not of the low-down grafter order, but quite the reverse. They are clear at the other extreme, the high-toned, so-called solid business men who have for years been exploiting the public for their own private gain, and in large measure they are the men who are creating the unrest at the present time. Now, what is the cure for part of our troubles? An awakening of civic righteousness, an aspiration for better civic conditions, a larger sense of duty and personal responsibility by just such men as are here to-night, a willingness to render service. We have in the last few years been passing through an industrial and commercial revolution, and the air is somewhat clearer. Much of the underbrush of pernicious business practices has been cut away. The lines between honesty and dishonesty have been resurveyed; new bounds have been set, and many men are viewing duty from a new angle of vision.

And what is the duty of those who are in control of our public service corporations? I do not like to sit in judgment on other men, but we are sometimes compelled to, but the longer I have been a student of municipal conditions the more it has seemed to me that a type of mind has been developed by the management of some public utilities which cannot, or at least does not, get a correct perspective of the duty which it owes the community. It is like what we are seeing exhibited in Germany to-day, — an utter inability to see the cold logic of facts except from a perverted angle of vision. The men in control of many of our public utilities have shown themselves to have been inspired by the spirit of supreme selfishness and that alone. One thought has been uppermost in their minds, and that has been to exploit the public for their own benefit. Now, if ever, is the time for them to consider diligently the public good and if for none other than the most selfish reasons, that lasting security may be given to their private interests. If they do not do this, if they do not change their policies and work more for the common good, there will be a day of reckoning for them.

There must be more publicity — there must be less done behind closed doors, and the accounts of these corporations must be kept so as to disclose rather than hide the actual conditions. Why do I make this so strong? Because it took months of work to get out of our Worcester Electric Light Company the information in regard to its condition that the mayor demanded in his contest with the company — information that he, as the chief executive of the city, had a right to know. From first to last there was a studied attempt on the part of the company to prevent the facts from being made known,— and why? Because they knew that they were overcharging the city and the citizens by excessive rates and putting the extra amounts so taken from the public into their plant, so that when the Gas and Electric Light Commission rendered its decision it gave the mayor everything he contended for.

The mayor protested against their taking from the citizens of Worcester over one hundred thousand dollars a year through a depreciation account that represented their method of bookkeeping to hide their profits, and the Commission, in rendering its decision said, " When the company first made a return to this Board, in 1888, it had a plant valued at $109 000 and a capital stock of $100 000. Its returns since then show that of the amounts expended on its plant, nearly one half has been provided out of earnings on account of depreciation charges and in the accumulation of an actual surplus; all this in addition to ample maintenance charges and its operating accounts." In other words, the Commission said that the City of Worcester and the citizens of Worcester had out of their own pockets paid for nearly one half of the plant, and in my opinion, the people of Worcester have paid for more than half of it, and yet they have not a dollar of interest in it.

They may come back and say they have never had any dividends on the surplus, but they don't deserve any credit on that score. In 1908 and 1909 the gas and electric light companies of the state had bills before the legislature asking for permission to capitalize their surplus so they could get dividends on it, although the headings on the bills presented to the legislature did not put it that way.

The mayor said they must be compelled to render service and give the public lower rates, and that they have done. He asked for a reduction in the price of street arc lights, of which there were about 900, from $91.25 to $80.00 per annum. The company wanted $96.28. The Commission gave the city $80.30 to make even money, 22 cents per lamp per night. The mayor said in his testimony that in three years the company would thank him for what he had done, and what has been the result? In 1909 the company did a business of $347 543.83, and notwithstanding the reductions in rates that have been made since then, their business for the year ending June 30, 1914, aggregated $880 248.19, and they made $76 265.04 more profit in 1914 than their total income in 1909, and they haven't come round with an honorarium of even a nickel to the now ex-mayor for helping to put them on their job. But there are compensations. I don't think there is a man connected with the company who is not my friend to-day, and he ought to be, for I was the best meal ticket they ever struck.

I cannot close this talk to-night without making acknowledgment and expressing my thanks, giving great credit to the attorney who fought this battle for the mayor and the city of Worcester. The city solicitor was ill and away from the city, and my friend, Webster Thayer, Esq., came to my assistance and put up the fight of his life, and without his splendid help the result might have been very different.

And now in closing permit me to say the public service corporations are the servants of the people and not their masters, and the master is entitled to an account of the servant's stewardship. The public service corporation must move out of the valley of seclusion, where it has too long transacted its business. Its new offices must be on the hills of publicity, in full view of the people, whose servant it is, and it will then be treated to a great surprise, for it will be found that it will cost less to do its business out in the open than it has cost it in the past to do it in back offices with the curtains drawn down. In that good old Book, now much neglected, but in which is stored the wisdom of ages, and to which even in these days of commercialism we can turn in hours of trial, sorrow, disappointment, and when burdened with heavy cares and responsibilities in bearing our twentieth-century burdens, and find in it the courage, the inspiration and the help that will hold us true to the course, we find expression to a fundamental truth when it says, — "And the truth shall make you free." And so it will be with the public service corporation when the light of publicity has been let in on their doings. When they have nothing to hide they can take the public into their confidence, "and the truth shall make them free."

DISCUSSION.

By Messrs. Alonzo R. Weed and Frederick J. Macleod.

Mr. Weed. — *Mr. President and Gentlemen,* — I told the President, a little while ago, that I came here to listen to Mayor Logan and not to make a speech. But one of my neighbors, who is in the habit of making after-dinner speeches, sometimes says that he is like a dog and speaks for his dinner. I suppose that perhaps I, likewise, owe to the President a speech for my dinner.

There were one or two things which Mayor Logan said — and I can assure you that I have seen him in action with his war paint on, his tomahawk in one hand and his rifle in the other, and I know he has done some very admirable service for his city — which I think are worth while emphasizing. If I speak in a very inconsequential way about them, I am sure you will pardon me for that.

I think he brought out one thing which very likely has impressed many of you gentlemen who have been before any public service bodies, the legislature or any committees or any other public boards, or even the municipal boards. And that is, that there is usually a very great inequality in the contests that go on before those boards. The men of training and brains and character are arrayed on one side, and there is a pretty raw product arrayed on the other, and the contest is not equal. I think this fact necessarily arouses in the minds of those who have to listen to that sort of a contest a good deal of sympathy for the public. The public is so often so extremely poorly represented. The case to which the mayor has alluded, which occurred in relation to the Worcester Electric Light Company, is one of the few cases which my Board has heard, since I have been a member of it, where the public really had an adequate representation, where you felt that in a way the two sides were on a fair equality in the character of the presentation of their respective cases, the evidence submitted, and the scope of the inquiry. Such a presentation is extremely helpful to any one who must for the time being try to hold the scales of justice.

There was one other thing to which he alluded which I do not believe has as much emphasis given it as should be given, and that is the question of complete publicity of the affairs of those corporations which have to do with the public service. The longer that I have dealt with questions of that sort the more I am convinced that this is the one feature of what we term public regulation which has a very substantial promise in it. I am inclined to think — and I am speaking, perhaps, rather frankly about it — that there are many other features that have not much promise. We are temporizing, we are dealing in ways that cannot perhaps be more than temporizing, in many other important features of those relations. But publicity is a thing which speaks for itself and is a thing which we never yet have attained. I am confident, personally, that, if we had a publicity which was not only complete in itself but which commanded confidence so that people thought that they were getting the truth, many of our troubles would solve themselves. I think that we oftentimes get a great deal more truth, that the facts are really revealed, far more than the public gives credit for their being revealed. But there has been a sufficient amount of the reticence to which allusion has been made, there has been a sufficient amount of evasion, of covering up, of trickery at times, to have excited a very great distrust in anything like a claim of frankness on the part of the public service corporations. And it works extremely unfavorably, and to the very great disadvantage of such of the men in charge of those corporations who are entirely willing to have the truth known, men of high character, who may differ with the public with respect to certain policies, but have no disposition at all to have any question raised about facts. A fact is a fact; it is changeless. If we can only know that fact, there is no longer any chance for dispute about it. The only question which then remains is as to what theory we shall have with respect to a known thing. We may well differ over theories and policies, but a fact should be known once for all. We need a publicity in which people have confidence and have reason to have confidence. When we have that, I am confident that very many disputes which become exceedingly acute at times will never occur at all.

There is something else which I would like to say, because I may not get a chance to talk to engineers *en masse* again. I see them individually a great many times, and I have come to have a very profound respect for the profession of engineering. I cannot conceive of anything really finer in the way of human achievement than to have the capacity to imagine some great undertaking, to see it in all its details, to see that the work is properly assembled and constructed and to see something actually grow under one's own hand and in consequence of one's own conception. This seems to me one of the finest bits of human achievement and human service that can be performed. I hope I have said that as earnestly and as emphatically as I feel. But I cannot but believe that there is a great deal of extremely valuable engineering ability which to my mind has been diverted from the fine things to which it might be applied in the attempt to determine a lot of things which are not worth determining after they are all found out, or apparently found out. I am speaking now of the great diversion of engineering ability to the effort of solving a great many of these so-called public service problems. We have in this country, for a variety of reasons, come to have a large literature, and a wide discussion through technical journals and from engineers on what is called the reproductive value of property. But it is a speculation, as we all must realize, and relates to something which never will happen, and which is never expected to happen; and after you have speculated and reached such agreement as wide differences of opinion, due to varying unit costs and to the elements of value to be considered, makes possible, the conclusion really settles nothing permanently.

For my own part, I think that that is a great waste of a finely equipped body of human energy, and it seems to me that it is a diversion, a very great diversion, from the great work of which it is capable. I think it has come about, to some extent, through a misconception of the whole policy and theory of public regulation, of its philosophy, if I may speak of it as such. It is true that the only reason we try to regulate at all is because we are trying to enlist private capital in certain services which the public manifestly might perform for itself if that seemed the more expedient way. And we have created to a very considerable extent with regard to them exclusive privileges for their performance, for a variety of reasons which it is hardly necessary to discuss here.

I have never supposed that a monopoly in a public undertaking was essentially different from a monopoly in a private undertaking. And I have supposed, and I think there is reason to believe, that the inducement to monopoly is that profits by reason of monopoly can be increased over what is probable in a state of competition, or they can be made surer by means of monopoly. And I suppose when we are trying to settle the questions of public regulation, we are in reality trying to enlist self interest, private capital, having all the desires and impulses that private capital has in any unregulated business, and trying to curb its very natural desire for an excessive profit, or a profit beyond the profit which it might get without the monopoly, or the sure and safe profit and therefore usually the stagnant service which might also result from the control of the supply.

That is what we are trying to curb, and perhaps it may be done by the application of some of those universal and mathematical rules which have been laid down from time to time. On the other hand, so far as I have seen corporations, they differ just about as much as individuals. They reflect, just as individuals reflect, the motives, desires, dreams, ambitions, failures, successes of the men who dominate them from time to time. We cannot cast them all in the same mold because they cannot in the nature of things be cast in the same mold, and we have to deal with them as best we may. But what we are really trying to control and to keep within reasonable bounds is this very natural desire with respect to profits which must always exist, so far as we can see, so long as we have private ownership at all.

I was rather interested the other day. A man came in — and he happened to be a lawyer — to talk with me about a matter of rates, and he expressed an idea that I had never heard expressed in the same way, in saying that any public interference with rates was confiscation. We have discussed, until the air is blue with discussion, how far we can go in such interference without confiscating. But he said any interference is confiscation, just as any taxation, to the extent to which it goes, is confiscation. I am not sure but that he may be right, and that we are only saying to what degree it may go; trying to find some practical measure for it. I do not believe personally that the problem is strictly an engineering question, although the technical knowledge, the engineer's point of view, the engineer's knowledge, offer information on many factors which are extremely important.

What I sincerely hope, as I said before, is that the tremendous service which engineers do perform, and can perform, may not be diverted from their real work to what seems to me to be rather a side issue.

Mr. Macleod. — *Mr. Chairman and Gentlemen,* — I felt rather put at my ease when Mr. Weed stated that he had come here this evening with the expectation that he would not be called upon for an address. I thought that he would content himself with making a few formal remarks, and that I could deal with the subject in the same summary way and save my face. But after the elaborate and interesting address that we have just heard from Mr. Weed, I suspect that he must have been turning over some of these things in his mind before he came here this evening.

As far as I am concerned, I can also say with entire frankness that I had no idea that I was going to be called upon to speak. Perhaps it is just as well that I received no such intimation in advance, as otherwise I should not have had such a good time this evening, or, indeed, I might not have been here at all.

The Commission of which I have the honor — or perhaps after listening to Mr. Logan's address I should say the notoriety — of being a member, has, during the last few weeks especially, had a rather strenuous time. We have had the ordinary routine matters which come in the normal course of the Commission's work, and in addition we have had a large number of matters of capital importance thrust upon us with alarming confusion and alarming frequency by the legislature. We are expected, by drawing upon some hidden reservoir of wisdom, to present in a report which has been incubated over night, a final solution of some of the most complex problems in the whole field of public service regulation. Consequently I have been obliged, owing to the tremendous pressure of official business during the last two or three weeks, not only to work during the normal time of an ordinary business day, but also to disregard the eight-hour law by remaining at the office till nearly midnight, and even to use the Sabbath day in the same ungodly fashion. I trust that I may be pardoned, therefore, if just at this time I do not feel any particular enthusiasm for talking shop.

I should like to say, however, that I do not know of any address that I could have heard this evening on a subject of this kind which would have been as little fatiguing as the address to which we have just listened. The whole matter was presented with so much spirit, and with so many humorous touches and interesting thrusts and parries, that it was an intellectual delight, and I know of nothing that could have afforded me as much mental stimulus and refreshment this evening as Mayor Logan's address.

The mayor, from his experience in dealing with public service problems in his own city, has called attention to certain facts, and has expressed certain views, that are well worthy of the attention of an audience of this kind, or indeed of any kind of an audience. His address may not have given the entire story, but it presented one side of the shield. In so far as it may not represent, perhaps, the whole truth in regard to some of these problems, I do not conceive that it is any part of my function as chairman of a commission representing the public to try to present anything on the other side of the case. I quite agree with Mr. Logan that the public service companies are abundantly able to present their side of the case on all occasions.

I was struck, just as was Mr. Weed, with that part of Mr. Logan's address which pictured, I think very vividly, the conditions which are apt to attend hearings before legislative committees and commissions upon matters affecting public service corporations. These conditions are well illustrated in an important case which the Public Service Commission has recently had under consideration. In that case the Commission in joint conference with the commissions of other states was attempting to formulate a program for uniformity of law and policy in railroad regulation within the several states exercising concurrent jurisdiction over interstate railroad corporations. The Commission gave public hearings on this matter and expected to receive many valuable suggestions from representatives of the public in regard to proper measures for safeguarding the public interest in a matter of such vital importance to the people of this Commonwealth. But when the case was called, and during the progress of the hearings, there were only eight or ten men in the hearing room. They were an intellectual group of men of extremely fine personal appearance, and they all represented the corporations.

The fact that in so many cases the public side of a pending issue is either not presented at all, or presented only in a feeble manner, adds a large additional burden to the work of regulating commissions, as the functions and duties of the commissions are in many ways so much broader than those of the courts. The courts are obliged in the main to try the case on the record of the evidence presented by the parties. If a litigant fails to bring out some pertinent part of his case, or to introduce certain necessary evidence, the decision goes against him, as the court is not expected to make any independent investigation of the facts. But not only is the duty thrown upon the Commission of considering the evidence presented by the parties at the hearing, but it is also obliged to supplement the facts presented at the hearing with all the facts it is able to discover through its own investigations.

I believe, however, that most of the members of our public commissions do recognize and do make allowances at every stage of the proceedings for the fact that the representatives of the public service corporations are apt to be more experienced, more able and more adroit than those who represent the public. In reaching its conclusions on any case the Commission should make, and does make, allowances to represent the bias which comes from that interested point of view. If you have a commission with knowledge and experience in regard to matters within its jurisdiction, it is in the last analysis a pretty difficult matter for any lawyer or advocate, no matter how clever he may be, to disguise or to befog the real issue.

The possibility of this is apt, I believe, to be greater, especially in abstruse or complex matters, where hearings are given by legislative committees, or by boards of aldermen or other local boards. This is by no means due to the fact that they have any less zealous regard for the public interest; indeed, as they are the direct representatives of the people, we might assume that their regard for the public welfare is greater than that of appointive commissions who represent the public one degree removed. But it is easy for men who are holding an ephemeral position for a year or two in the legislature or the board of aldermen, and who are obliged to deal with many matters of which they have no expert knowledge or personal experience, to be misled by the subtleties of special pleading which often have just enough basis of truth to be well calculated to impress and perhaps to deceive those who have merely a general knowledge of the subject under discussion.

So far as local problems of the city of Worcester are concerned, I might say that the first legacy that I received from my predecessors when I became a member of the board of railroad commissioners in August, 1911, was the question of granting a limited-term trolley freight franchise to the street railway company operating in the city of Worcester. At that time the hearings on this case were all over, the evidence was all in, and the matter had practically been concluded, although, as I recall it, the duty fell upon me of drafting the order to which the mayor has referred.

In this connection I might add that the Commission is often blamed, and perhaps blamed justly, for its lack of wisdom or its lack of public spirit in some matters; but it is also often blamed for things for which it is not justly to be held responsible, as the Commission is obliged to act in conformity with existing laws, and to administer these laws as they stand. We have nothing to do with the creation of those laws, and if they are alleged to be bad in any case it is due to conditions beyond our control. The matter to which Mayor Logan referred is a case in point.

The city of Worcester asked the Commission to grant the Worcester Consolidated Street Railway Company a trolley freight franchise in the city of Worcester limited to a term of years, but as the Commission viewed it, it had absolutely no discretion to grant any such request. The Commission is, under the law, directed to act under the advice of the attorney-general, who is the law officer of the Commission and its adviser. The Commission was advised by the attorney-general that it was beyond the power of the Commission to approve a limited term franchise. The Commission therefore had no discretion except to approve the franchise with such conditions and limitations only as were authorized by law. I might add also that the rights of the city were amply safeguarded, as the order was drawn advisedly in such a way that the legal issues presented by the city can be raised at any time in the courts. If therefore the city believes that the Commission or its adviser, the attorney-general, was in error in regard to the law, the city has full opportunity to test that matter in the highest legal tribunal of the state.

There are a number of things suggested by the discourse of the evening that I might like to say, but lest I be accused of attempting to make a speech, I will refer briefly to one matter only. In public service regulation, as in most other matters, I believe in the largest practicable degree of home rule. Where the action of the local authorities is subject to review by the Public Service Commission, the Commission is very slow to interfere with any reasonable exercise by local boards of the authority vested in them in regard to grants of franchises to public service companies, or in regard to other matters within their jurisdiction. Indeed, in so far as public service corporations are purely of local character, it might be advantageous to broaden the present scope of municipal regulation.

I attended a conference in Philadelphia, two or three months ago, of the mayors of different cities and representatives of different state commissions, in regard to the regulation of municipal utilities. This conference proved to be one of the most interesting that I ever attended, because it gave a viewpoint on certain matters distinctly different from the general viewpoint in this state. The dominant sentiment of that conference, representing, I believe, all the large cities and a great many of the more important cities of lesser size, was in favor of the extension of municipal regulation, even at the expense of state regulation.

Personally, I believe that in a great many matters where the municipality is in a position to deal directly with the company involved, it can often get results, and get them more directly, than they can be obtained through elaborate and extended investigations through commission regulation. On the other hand, there are difficulties in the way of local regulation over corporations that are not purely local in character. Of course the railroads not only serve different cities, but different states as well, so that municipal regulation of railroad companies is practically out of the question. The same is true to a large extent of street railway companies. For instance, the street railway company that serves the city of Worcester serves a large number of other cities and towns in the Commonwealth. If each municipality attempted to deal independently with that company it would be subjected to many different and possibly conflicting requirements which would be likely to produce a condition of chaos. At the same time I am distinctly in sympathy with the extension of regulating power by the municipal authorities whereever it is reasonable and practicable. This would afford a wholesome and additional check on some of the abuses of public service companies that we have been hearing about to-night.

From such investigation as I have been able to make of existing conditions, I am convinced that the troubles of the railroads and other public service companies have been due, not to too much regulation, as some of the officials of the companies would try to have you believe, but to too little regulation. The difficulties that have been confronting these corporations have been due to the fact that they have indulged in practices that have been unwise, imprudent, or worse, and have done so either because of lack of adequate powers of public service regulation, or because such powers have been inefficiently exercised. I therefore welcome anything that represents a strengthening of the forces of the public in dealing with the public service corporations that serve the municipalities and the state alike. The example of the mayor of a great city, such as Mayor Logan, who has fought so zealously for the protection of public rights, is one that is worthy of emulation throughout the Commonwealth.

MEMOIRS OF DECEASED MEMBERS.

ROBERT LELAND READ.*

MR. READ was born in Manchester, N. H., on July 12, 1841, and he died in Portland, Me., on June 9, 1912. His ancestors were distinguished in the early history of the country and in consequence he became a member of the Society of Colonial Wars and several other prominent organizations interested in the colonial and revolutionary periods. After his retirement from the active duties of his profession, he was frequently present at their meetings in Boston and was always actively sympathetic in their proceedings.

Mr. Read was educated at Dartmouth College, and was one of the early graduates of the Chandler Scientific School. In 1864 there were seven graduates, Mr. Read being the only one of that number who entered the profession of civil engineering.

Soon after leaving his studies, Mr. Read, in January, 1865, was fortunate in securing a position as assistant engineer on some surveys connected with the Indianapolis, Cincinnati & Lafayette Railroad, and he remained with this road for several years. The war was just ending and the railroads were passing through a trying period, with little money available either for maintenance or construction; it is therefore rather surprising to find that the compensation given Mr. Read was $100 per month and all expenses paid. A short time afterwards we find, from Mr. Read's notes, that the regular pay for an instrument man was $130 per month and expenses. The panic of 1873, however, caused these prices to drop suddenly and permanently.

The early railroad experiences of Mr. Read follow closely the experiences of the writer of this sketch in southern Indiana at the same period, and are so characteristic of local conditions at that day that he has ventured to rehearse some of Mr. Read's notes and later to quote several lines in full.

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* Memoir prepared by Desmond FitzGerald.

A majority of the railroad officials prided themselves on being practical men, with no scientific training. They looked on an engineer as a necessary evil in construction, and one to be quickly discharged as soon as the roadbed was finished. The master mechanics were generally promoted from the ranks of locomotive engineers and, as a rule, had but a poor opinion of book-learning. The master mechanic of Mr. Read's road once said to him, " I never bother myself with what other master mechanics are doing, except to make my engines different from theirs, so the president and superintendent of our road will think they have a smarter man than the other roads have."

Under this system, when the " Big Four " roads were consolidated, out of five hundred locomotives, there were 115 different types. They were small wood-burners and capable of drawing only from three to four cars.

Soon after Mr. Read began his railroad work, he was sent to make surveys of a branch line from Fairland to Martinsville. In regard to this branch, Mr. Read writes: " . . . the first twelve miles being new line and the last twenty-six the rebuilding of an old road that had been originally laid with strap rail and abandoned many years previously when the track became so bad that a man had always to walk ahead of every train with spikes and maul to fasten down the loose rails.

" The resident engineer ran the transit and I the level. Just before the location was finished, the resident engineer went on a spree, and I never saw him on the work afterwards. The chief engineer, who only spent a few hours on the work during the whole period of construction, placed me in charge, but would give me no assistant, so I had to do all the instrument work, inspection and office work; this meant at least sixteen hours a day. Our party was not allowed a horse, so we had to walk the thirty-eight miles between the ends of the work, living on the country, with all that meant in southern Indiana, which was principally settled by poor whites from Kentucky."

Following these early experiences, Mr. Read became chief engineer of several railroads connected with the " Big Four " system. From October, 1870, to May, 1871, he was engaged as contractor on the construction of twenty-nine bridges on the Atchison Road, after which he was connected with the Ohio & Mississippi Railroad, the construction of the Storrs incline at Cincinnati, and later became chief engineer of the Indianapolis Belt Railway; in the latter capacity he was associated with General Harrison, the attorney for the enterprise, who later became President of the United States.

In 1874 Mr. Read became a member of the American Society of Civil Engineers, and later a director. He was at one time president of the Engineer Club of Cincinnati and was associated with other engineering societies.

Mr. Read married Miss Abby H. Eastman, of York, Me., on September 2, 1869. She was a daughter of Dr. Caleb Eastman and Adeline Talpry, and she died August 30, 1893.

When Mr. Read retired, he removed to Malden, and in the summer was a prominent resident of Biddeford Pool, Me., where he was active in good works of every kind. In his will was a bequest of one thousand dollars to Dartmouth College, " the income of which is to be used as an annual prize for the best work in descriptive geometry."

The above are the hard and fast outlines of a busy life; but they poorly portray the real man, whose kindness and charm of manner endeared him to all with whom he came in contact. The latter part of his life, after the struggles and heat of the day had passed, must have been in many ways a very lonely one, but he was never heard to complain, and maintained a calm and cheerful spirit to the end.

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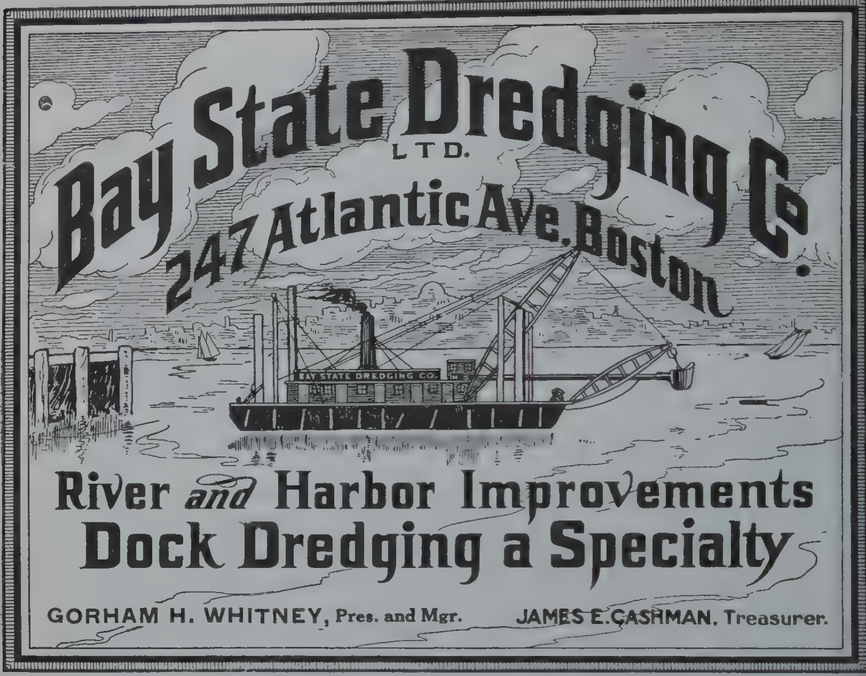
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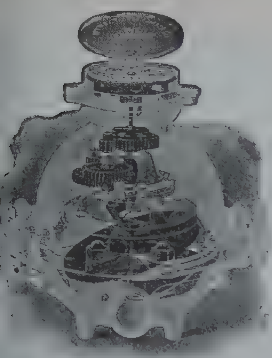

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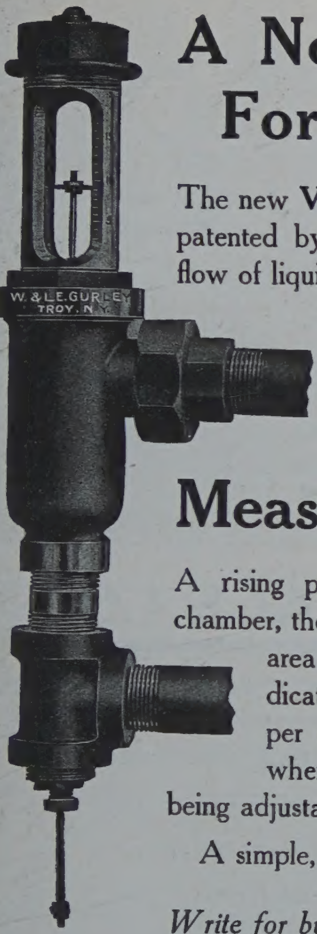

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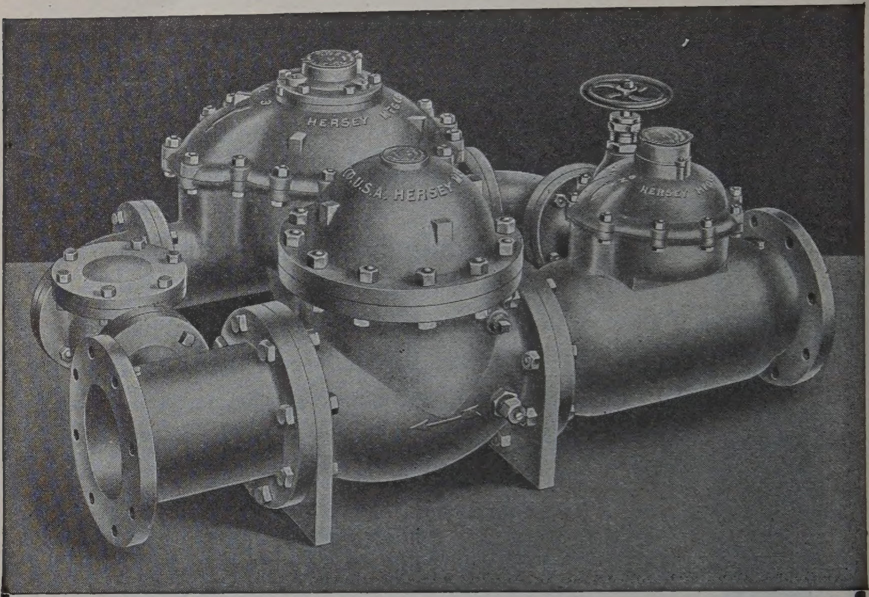

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